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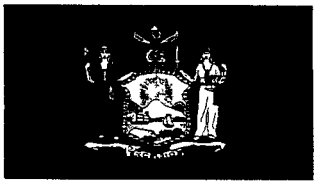

New York

LTPP Specific Pavement Studies

Construction Report on
SHRP 360800,SPS-8 Project,
Brockport, NY, Summer of 1994

Report No. FHWA-TS-95-36-01

March 1995

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LTPP Specific Pavement Studies

Construction Report on SHRP 360800, SPS-8 Project Brockport, NY, Summer of 1994

Report No. FHWA-TS-95-36-01

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March 1995

Technical Report Documentation Page

1 Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FHWA-TS-95-36-01		

4. Title and Subtitle	5. Report Date
LTPP Specific Pavement Studies Construction Report, SHRP 360800, SPS-8 Project, Brockport, NY, Summer 1994	March 1995 6. Performing Organization Code
7. Author(s) Basel Abukhater	8. Performing Organization Report No.
9 Performing Organization Name and Address **Pavement Management Systems Limited** 415 Lawrence Bell Drive - Suite 3 Amherst, New York 14221	10. Work Unit No. (TRAIS) 11. Contract or Grant No. DTFH61-92-C-00007
12. Sponsoring Agency Name and Address **Federal Highway Administration** LTPP-Division, HNR-40 Turner-Fairbanks Highway Research Center 6300 Georgetown Pike McLean, Virginia 22101	13. Type of Report and Period Covered 14. Sponsoring Agency Code

15 Supplementary Notes

The report is a cooperative effort between New York State Department of Transportation (NYSDOT) Materials Bureau Region 4 Construction Division and Pavement Management Systems Limited LTPP North Atlantic Region Coordination Office.

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16. Abstract

This report provides a description of the construction of an SPS-8 experimental project for the study of the environmental effects of asphalt concrete pavements in the absence of heavy loads conducted as part of the Long Term Pavement Performance (LTPP) program at Brockport, New York The construction of three asphalt concrete surface pavement test sections started on July 1, 1994 and was completed on August 12, 1994. The construction started with the subgrade preparation followed by laying of a dense graded aggregate base layer of different thicknesses, and then, paving using a Dense Type 1 Asphalt Concrete Base layer, a Dense Type 3 Asphalt Concrete Binder layer, and a High Friction Type 7F Asphalt Concrete Surface layer. The report contains a description of the non bound pavement layers preparation, the paving operations, the equipment used by the contractor, the field sampling and testing operations during and after construction, problems encountered during construction, specific site circumstances, deviations from the standard guidelines, and a summary of the initial data collection

17 Key Words	18 Distribution Statement		
Monitoring, Survey, FWD, Profilometer			
19 Security Classif (of this report)	20 Security Classif (of this page)	21 No. of Pages	22. Price

Form DOT F 1700 7 (8-72) Facsimile

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Construction Report on SHRP 360800, SPS-8 Project, Brockport, NY, Summer of 1994

I. Introduction

New York State Department of Transportation (NYSDOT) SPS-8 project at Brockport, NY, is a study of the environmental effects on the performance of asphalt concrete pavements in the absence of heavy loads. The project lies in the wet-freeze environmental area with a fine-grained subgrade In addition to the two SHRP test sections of the main experiment, with test section 360801 being a thin structure of 102 mm of asphalt concrete on 203 mm of granular base and test section 360802 being a thick structure of 178 mm of asphalt concrete on 305 mm of granular base, there is one NYSDOT (agency design) supplemental section 360859 consisting of 165 mm of asphalt concrete on 305 mm of granular base as shown in Table 1

The project is built on the east bound lanes of Lake Ontario State Parkway (LOSP), approximately 8 kilometers north of the town of Hamlin, 18 kilometers north of the town of Brockport, and 32 kilometers north west of the city of Rochester The three test sections are constructed adjacent to each other in series starting at the construction chainage of 111+00 and ending at 137+50 The SHRP station 0+00 of section 360801 being at construction station 111+00, and the SHRP station 5+00 of section 360859 being at construction station 137+50, Figure 1 Each section is 152.4 meters long and 3.7 meters wide The outside shoulder is paved with a width of 1 5 m.

The project was built as part of the State of New York, Department of Transportation, Office of Engineering Contract No. D254995, Reconstruction on Lake Ontario State Parkway, Route 947A and LOSP 49-1, from Yanty Creek to route 260, near the town of Hamlin, Monroe County The project was advertised for bids on February 24, 1994 using NYSDOT standard contract administration and construction procedures. The contract was awarded to Keeler Construction Co Inc of Albion, New York on March 30, 1994 and the first stages of work started on April 8, 1994 with a project completion date of June 30, 1995

A contract planning meeting was held at NYSDOT Region 4 office in Rochester on Tuesday May 18, 1993 at 1000 hours The latest version (May 1990) of the Field Materials Sampling, Testing, and Handling Guidelines, along with the SPS-8 Construction Guidelines, Data Collection Guidelines, and Laboratory Testing Guidelines were handed to the NYSDOT personnel by Mr. Ivan Pecnik, the Long Term Pavement Performance (LTPP) Regional Engineer (RE) of the North Atlantic Region, and Mr. Basel Abukhater of Pavement Management Systems Limited (PMSL) North Atlantic Regional Office (NARO) At the meeting were Ms Sally Olsen, NYSDOT, Mr. Carlton Jarvis Jr. and Mr. Ken Hulbert, NYSDOT Design, Mr A A Mieczkowski, NYSDOT Construction, Mr. Sonny DiCenzo, NYSDOT Materials, and Mr Richard Kiehle and Mr. Paul Peffers,

NYSDOT Soils. The meeting was held at the request of NYSDOT to clarify mainly the sampling and testing requirements, but various other items were discussed including the Laboratory testing responsibilities of the State Lab and the FHWA Contractor Lab. Also the responsibilities on site during construction and the coordination between the SHRP representative and the State and Contractor personnel. The FWD testing on the subgrade and aggregate base layer were also emphasized as well as the weather station installation requirements and responsibilities of the different parties.

A pre construction meeting was held at NYSDOT Region 4 office in Rochester on Friday June 10, 1994 at 1000 hours. Mr. Ivan Pecnik, the LTPP RE of the North Atlantic Region, and Mr. Dennis Morian and Mr. Basel Abukhater of PMSL NARO attended the meeting that was arranged by the Engineer In Charge (EIC), Mr. Tim Davison. Also present in this meeting were NYSDOT personnel from the Construction, Design, Materials, Soils, and Maintenance as well as Mr. Eric Wilson of Professional Service Industries, Inc. (PSI) and Mr Scott of Keeler Construction Co., Inc. Mr. Tim Davison announced that the project had already started on April 8, 1994 and that within a few weeks subgrade work will start at the SPS location Field material testing and sampling were discussed with Mr. Eric Wilson of PSI, the subcontractor of Keeler Construction to carry out all the field testing and material sampling and the state portion of the laboratory testing. Weather station requirements were discussed and the LTPP-SPS Automated Weather Station (AWS) Installation and Site Nomination forms were handed by Mr. Ivan Pecnik to Mr Kevin Miller of NYSDOT Design to fill and send back for site approval before installation. Appendix B includes all correspondence related to the AWS nomination, approval, and installation Weigh In Motion (WIM) equipment installation was also discussed.

On site and in charge of the construction work were Mr Perry Gernold, Inspector, earth works, and Mr Dennis Barefoot, Inspector, asphalt and paving. Mr. Barefoot filled out most of the Construction Data Sheets. PSI was responsible for all the Field Testing and Material Sampling on site as well as the laboratory testing. Mr Mark Trimper of PSI was responsible for all the nuclear density testing and the bulk sampling on site and at the asphalt plants. Mr Harvey Cole of PSI was responsible for the Shelby tube sampling and the shoulder probes as well as the coring of the asphalt concrete layers. Laboratory testing will be done by PSI at four different locations Subgrade soils will be tested by PSI Buffalo under the supervision of Mr Eric Wilson at 605 Young Street, Tonawanda, NY 14150 (SHRP Laboratory Assigned Code 3631) and by PSI Pittsburgh under the supervision of George Miller at 850 Poplar Street, Pittsburgh, PA 15220 (SHRP Laboratory Assigned Code 4211) Testing on the unbound granular base will be conducted by PSI Detroit under the supervision of Dennis Rama at 24355 Capitol Avenue, Detroit, MI 48239 (SHRP Laboratory Assigned Code 2632). Testing of asphalt concrete, extracted aggregate, and asphalt cement will be done by PSI Canton under the supervision of Tom Bowker at 905 Turnpike Street, Canton, MA 02021 (SHRP Laboratory Assigned Code 2531)

Keeler Construction Co. used asphalt from two mixing plants. Both are batch type plants, the first is Genesee LeRoy Stone Corporation Plant located in Stafford, NY and manufactured by Gencor model number 6B, 6 ton batch size, and the second is Iroquois

Rock Products Plant located in Brockport, NY and manufactured by Cedar Rapids model number 460B, 4 ton batch size. The paving equipment used in the construction included a BLAW-KNOX model CPF-200 AP87 paver and Tampo RS-188A model VC80 double-drum vibratory steel wheel rollers. For the earth works, a Rascal 400-A 9.9 ton single-drum steel roller with hydraulic vibration was used. Weather information was recorded manually during construction and an Automated Weather Station (AWS) is planned to be installed in the early spring of 1995, close to the east end of the project on route 19, see map on page A-15

II. Project Details

Layout

The two main SHRP SPS sections and the NYSDOT supplemental section are laid in series starting with the SHRP thin section 360801 at construction station 111+00 followed by the SHRP thick section 360802 starting at construction station 119+00 and finally the NYSDOT thick supplemental section 360859 starting at construction station 132+50 and ending at station 137+50. The initial plans were to have the supplemental section 360859 start at station 131+00 and end at station 136+00 but because of a cold transverse construction joint in the AC binder layer at station 132+30, left from the evening of August 11 to the morning of August 12, 1994, the site was shifted to stations 132+50 to 137+50 The construction guidelines of the SPS-8 experiment requires that "All transverse construction joints shall be placed outside the test sections, e.g. within the transitions between the test sections". Table 1 also displays the construction station of each section including the sampling areas.

Field Materials Sampling and Testing

Locations for field material sampling and testing are summarized in Figure 2. Two main stages of field material sampling and testing were involved here, first, during construction of the subgrade, aggregate base, and asphalt concrete pavement layers, and second, after construction of the final surface layer Table 2 summarizes the field testing on every layer, the number of tests, and the location designation. Table 3 summarizes the material sampling for each of the layers, the number of samples collected, and sample location of each. Table 4 is intended to show the number, quantity, and location of the bulk samples collected during construction, and to identify those to be used for testing as part of the SPS-8 experiment, and those to be sent to the Materials Reference Library. NYSDOT hired the contractor Keeler Construction Co. to do all the field testing, material sampling, and laboratory testing required of the agency Keeler hired a subcontractor, Professional Service Industries (PSI) of Buffalo, NY, to carry out all the field testing, material sampling, and laboratory testing Table 5 shows the dates of all the field testing and sampling activities throughout the construction and post construction periods. Table 6 lists the actual date as compared to the guidelines on initial monitoring measurements of SPS-8 sites.

The laboratory material testing plan is summarized in Table 7 for the different layers. The SHRP test designation and Protocol number for each test is tabulated and so are the

number of tests per layer and material source or test location. Aggregates to be extracted at the PSI Laboratory will be shipped to the National Aggregate Association's Joint Research Laboratory (NAAJRL) for the Fine Aggregate Particle Shape Test, Designation No. AG05, Protocol P14A. In addition to the PSI Laboratories in Buffalo (Tonawanda) NY, Detroit MI, Pittsburgh PA, and Canton MA, some of the testing, especially the Resilient Modulus, will be performed by the FHWA-LTPP Contractor Laboratory, Law Engineering, Inc. in Atlanta, Georgia.

III. Construction

Table 8 lists all the dates of the construction activities for all the sections. The subgrade layer over sections 360801 and 360802 was ready on July 14, 1994 while section 360859 was not ready till late July 15, 1994. A lot of effort was put into arranging for FWD testing of the final subgrade and DGAB layers so that no delay to the construction activities was caused by this test Keeler Construction Co. used two asphalt batch plants for AC base and binder material, while only one source was used for the AC surface layer material

Subgrade Preparation

The contractor used a 9.9 ton single-drum Rascal 400-A roller with hydraulic vibration to compact the subgrade material. The original pavement was removed and the construction on the subgrade layer started on July 12 and was completed on July 15, 1994. FWD testing on the subgrade layer of sections 360801 and 360802 was conducted on the morning of July 14, 1994 and on section 360859 in the late afternoon hours of July 15, 1994. Hard rock was encountered at depths varying from 0 36 m to 4.27 m during the Shelby tube sampling and shoulder augering operation During Shelby tube sampling on July 16, 1994, hard rock was hit at different depths ranging from 0.36 m at station 0+99 offset 3.05 m from the outside shoulder of section 360859 to 0 46 at station 2+50 offset 3 05 m of section 360859 to areas where the drill rig went as deep as 1 22 m to collect the tube samples without hitting any rock The shoulder probes did hit rocks at shallow depths but was able to grind through this shale rock and went as deep as 3 96 to 4.27 m. The photo in Figure B-1 of Appendix B shows shale rock that came out from the shallow depths of shoulder probe location S1 at station 2+55 offset -0 91 m from the outer edge of pavement of section 360801

After finishing the subgrade layer, in-situ densities were measured with the nuclear gage by PSI staff at 12 locations, 9 inside the sections and 3 at the bulk sample locations, as indicated in Figure 2 Values of the measured in situ densities and moisture contents are presented in Table 9 Also Shelby tube sampling was performed at 9 locations and three shoulder probe augerings were conducted, all by PSI staff. Bulk and moisture subgrade samples were also collected from three locations by PSI and taken to their laboratory at 605 Young Street, Tonawanda, NY 14150 (SHRP Laboratory Assigned Code 3631). Elevation shots were taken on July 14 and 15, 1994 by the contractor's staff, on top of the subgrade layer as shown in Figure 3, Elev 1

Dense Graded Aggregate Base Preparation

For the dense graded aggregate base course (DGAB), the contractor used a CAT 14E grader to spread the material and a 9.9 ton Rascal 400-A single-drum steel vibratory roller for compaction. The construction of this layer started on July 28, 1994 and was completed on August 9, 1994. Section 360801 had 203 mm of DGAB that was laid in one lift while sections 360802 and 360859 had 305 mm of base layer which were laid in two lifts, the first was 203 mm and the second was 102 mm. FWD testing on the DGAB layer of the three sections was performed on July 25, 1994. According to the SHRP SPS Testing Protocol P59, the FWD testing should be performed after completion of compaction and fine grading and prior to placement of the next layer, and in the absence of standing water. Also the test locations should be as clean as possible of rocks and debris to ensure that the loading plate will be properly seated. Also the surface should be as smooth as possible with no loose material. Unfortunately this was not the case during the subgrade and base testing, thus another FWD survey was conducted on August 3, 1994 after final grading of the base layer and prior to placement of the black top. In-situ densities were measured on July 25, 1994, using the nuclear gage, by PSI staff at 12 locations, 9 inside the sections and 3 at the bulk sample locations, as shown in Figure 2. Values of the measured in situ densities and moisture contents are presented in Table 9. Three bulk and three moisture samples were collected from the sampling areas at locations B4, B5, and B6 prior to final compaction Elevation shots were taken by the contractor's staff on top of the DGAB layer of all the sections on August 9, 1994, Figure 3, Elev 2. A prime coat of asphalt emulsion was placed on this layer prior to placing the next AC base layer. While the AC base course was being laid, the trucks and paver wheels picked up stone due to sticking of asphalt emulsion. This caused a disruption to the fine grade of the layer.

AC Dense Type 1 Base Layer Preparation

All three sections were paved first with an asphalt concrete base layer (job mix formulas from the two batch plants are provided in Appendix A) The paving started on August 10 and was completed on August 11, 1994, mixing temperatures of all the AC layers are listed in Table 10 On August 10 the AC base material started arriving in the morning from the Genesee LeRoy Stone Corp. Stafford asphalt plant, but due to complications at the plant, the delivery of material was slow causing the contractor to end short of closing the longitudinal joint while material was hot A longitudinal joint from station 118+00 to 138+00 (offset 3.15 m from the edge of pavement) was left "open" till the following day. On August 11 the base course was completed and the binder course began. Again due to difficulties at the Stafford asphalt plant, deliveries of base material was slow and so material was also brought in from the Iroquois Rock Products Brockport Asphalt Batch Plant as well Table 11 and Figure 4 show the locations where the material from each plant was placed throughout the project length. Table 12 and Figure 4 also list the dates and times of the paving on the left and right paving lanes and the temperature and weather data from the inspector's logs for all the sections It should be noted that the left paving lane consists of the 3 66 m left lane and 0 51 m of the right GPS lane, and the right paving lane consists of 3 15 m of the right GPS lane and 1.52 m outside shoulder The asphalt concrete paver used by the contractor for all his paving operations was a 1987 BLAW-

KNOX model PF 200 paver and the roller used was a 1980 TAMPO RS-188A model. Paving width was 4.17 m on the left lane and 4.67 m on the right lane, which includes most of the GPS lane and the outside shoulder. The longitudinal joint was at offset 3.15 m of the GPS lane. The thickness of the AC base layer on 360801 was 76 mm, on 360859 was 102 mm, and on 360802 was 114 mm. Each was placed in one lift although the guidelines have a maximum allowable depth of 102 mm per lift. Three bulk samples of the mixture were collected from the paver at the time of the paving operation while at station 2+50 of sections 360801 and 360802, and at station 1+00 of section 360859. Six 19-liter pails were collected from each location, three of each to be used as part of the SPS-8 laboratory testing and three to be shipped to the Materials Reference Library (MRL). On August 11, 1994 elevations shots were taken for all the sections on top of the base layer before placing the binder layer, Figure 3, Elev 3.

AC Dense Type 3 Binder Layer Preparation

Only sections 360802 and 360859 had AC binder asphalt concrete mixture with a thickness of 38 mm (job mix formulas from the two asphalt plants are provided in Appendix A) This layer was supposed to be laid starting at station 117+00, leaving the area from 116+00 to 117+00 (sampling area 2) with no binder course to represent the actual structure of 360801 during sampling. A mistake by the NYSDOT inspection staff had the contractor start his binder layer from 116+00, thus all the cores, CA05, CA06, CA07, CA08, and CA26, that were taken at locations C5, C6, C7, C8, and C26 inside sampling area 2 at construction station 116+25, or section 360801 station 5+25, were not representative of the site, as far as the thickness is concerned, as they had binder layer in them. Placement of this layer started on the afternoon of August 11 and finished during the early morning of August 12, 1994 Again due to difficulties at the Stafford asphalt plant, deliveries of binder material was slow and so material was also brought in from the Iroquois Rock Products Brockport Asphalt Batch Plant as well. Binder paving stopped at station 132+30 (station 1+30 of section 360859) on the evening of August 11 and started in the early morning of August 12, 1994, thus leaving a cold transverse joint at that location. The decision was to shift section 360859 from the original 131+00-136+00 location to the new location between stations 132+50 and 137+50. This shifting was recorded when the site was marked on September 6, 1994. Two bulk samples of the mixture were collected from the paver at the time of the paving operation while at station 2+50 of section 360802 and at station 3+50 of section 360859 Six 19-liter pails were collected from each location, three of each to be used as part of the SPS-8 laboratory testing and three to be shipped to MRL On August 12, 1994 elevations shots were taken for all the sections on top of the binder layer before placing the surface layer, Figure 3, Elev 4

AC High Friction Type 7F Surface Layer Preparation

The same paving and compaction equipment was used for the surface layer as for the AC base and binder courses (job mix formula from the asphalt plant provided in Appendix A). The material for paving of this layer was only brought from the Stafford plant. Paving started and was completed on August 12, 1994 All sections had the same thickness of 25 mm. Three bulk samples of the mixture were collected from the paver at the time of the paving operation while at station 2+50 of sections 360801 and 360802, and at station

1+00 of section 360859. Six 19-liter pails were collected from each location, three of each to be used as part of the SPS-8 laboratory testing and three to be shipped to MRL. On August 16, 1994 elevations shots were taken for all the sections on top of the surface layer, Figure 3, Elev 5 In-situ densities were measured at 9 locations, covering the three sections, on November 11, 1994. Values of the measured in situ densities are presented in Table 9 Cores of the asphalt concrete layers, from the sampling areas, were collected on November 22, 1994. Table 13 lists the thicknesses of all the cores collected on that day. Table 14 lists all the thicknesses as determined by the Rod and Level Elevations.

According to the SPS-8 Construction Guidelines, the as-compacted thickness of the asphalt concrete (surface plus binder plus base) in the test sections shall be constructed to within $\pm$ 7 mm of the value specified in the experimental design (i.e. 102 $\pm$ 7 mm for 360801, 178 $\pm$ 7 mm for 360802, and 165 $\pm$ 7 mm for 360859). From Tables 13 and 14, it is obvious that the AC thickness, from most of the cores and the Rod and Level elevation measurements, are outside the limits. Sampling area 2 of 360801 at 5+25 , from which cores CA05 to CA08 and CA26 were collected, is not representative of the site, as far as the thickness is concerned, since the binder layer transition started at station 5+00, in spite of instructions not to do so This is why all the cores taken from that area were outside the limit to the higher range.

The two asphalt plants were visited on August 10, 1994 and samples were taken of the asphalt cement and the combined aggregate of each layer used in all the asphalt concrete paving Three 19-liter pails of asphalt cement were collected from each plant, one to be used in the SPS-8 laboratory testing and two to be shipped to MRL. Five 208-liter drums of combined aggregate were also collected from the asphalt plants. Three drums were collected from the Stafford plant, one of the AC base, one of the binder, and one of the surface layer combined aggregate material used. The remaining two drums were collected from the Brockport plant, one of the AC base and one of the binder combined aggregate material used. No surface mix was brought in from the Brockport plant

IV. Post Construction Operations and Initial Performance

The site was marked on September 6, 1994 according to the guidelines. Figure 5 shows the paint marks used on the sections to identify the location of the beginning of each of the sections and at 30 5 m intervals

Profilometer testing was performed on September 6, 1994 after marking the site. The average International Roughness Index (IRI) values from five runs for each of the three sections are presented in Table 15 Plots of the elevation measurements from the three sites are presented in Figures 6 to 8 The site was also videoed on September 6, 1994

The Falling Weight Deflectometer (FWD) and Manual Distress Survey (MDS) on the final layer of the three sections were performed on November 9 and 11, 1994 respectively. During the November 9 visit, it was found out that the Weigh In Motion (WIM) equipment had already been installed adjacent to the NYSDOT facility on Lake Ontario State Parkway, approximately half a kilometer away from the east end of the project.

During the monitoring period, September to November 1994, the site was reported as having no obvious distresses and was performing satisfactorily

Table 1. Site Layout, SPS-8, Lake Ontario State Parkway

Constr-uction Stations	Experi-mental Stations	Length (m)	AC Thickness	Granular Base Thickness	Remarks	Section ID
108+41					Sampling Area 1	
111+00	0+00	152.4	25 mm Top 0 mm Binder 76 mm Base	203 mm	Begin Monitoring Section	**360801**
116+00	5+00				End Monitoring Section	
117+00					Sampling Area 2	
117+00					Sampling Area 3	
119+00	0+00	152 4	25 mm Top 38 mm Binder 114 mm Base	305 mm	Begin Monitoring Section	**360802**
124+00	5+00				End Monitoring Section	
130+00					Sampling Area 4	
130+00					Sampling Area 5	
132+50	0+00	152 4	25 mm Top 38 mm Binder 102 mm Base	305 mm	Begin Monitoring Section	**360859**
137+50	5+00				End Monitoring Section	
138+00					Sampling Area 6	

Note Top - High Friction Type 7F Asphalt Concrete Surface Mix
Binder - AC Dense Graded Type 3
Base - AC Dense Graded Type 1

Table 2. Scope of Field Testing

Layer	Number of Tests	Location Designation
Asphalt Concrete Surface In-Situ Density (Nuclear Gage)	9	T19-T27
Unbound Base In-Situ Density and Moisture Content (NG)	9	T10-T18
Subgrade In-Situ Density and Moisture Content (NG)	9	T1-T9

Table 3. Scope of Material Sampling

Layer	Number of Samples	Sample Location
Asphalt Concrete		
Coring - 102 mm Diameter	24	C1-C24
AC Surface Bulk Sampling	3	BV7-BV8-BV9
AC Binder Bulk Sampling	2	BV5-BV6
AC Base Bulk Sampling (182 kg of each mix uncompacted)	3	BV1-BV2-BV3 from plant or roadway prior to compaction
Asphalt Cement (3-19 liter samples from each plant)	2	BC01-BC02 from two plants
Unbound Base		
Bulk Sampling (182 kg samples)	3	B4-B6
Moisture Content Samples	3	B4-B6
Subgrade		
Shelby Tube Sampling (2 tubes per hole)	18	A1-A9
Bulk Sampling (182 kg samples)	3	B1-B3
Moisture Content Samples	3	B1-B3
Shoulder Auger Probes (Depth to Rigid Layer)	3	S1-S3

Table 4. Bulk Material Sampling During Construction

A. Materials for Testing as Part of the SPS-8 Experiment

Material Description	Number of Samples	Quantity of Each Sample	Sample Location
AC Surface	3	3-19 liter pails	BV7-BV8-BV9
AC Binder	2	3-19 liter pails	BV5-BV6
AC Base	3	3-19 liter pails	BV1-BV2-BV3
AC Cement	2	1-19 liter pail	Two Mix Plants

B. Materials for Shipping to the SHRP Materials Reference Library

Material Description	Number of Samples	Quantity of Each Sample	Sample Location
AC Surface	3	3-19 liter pails	BV7-BV8-BV9
AC Binder	2	3-19 liter pails	BV5-BV6
AC Base	3	3-19 liter pails	BV1-BV2-BV3
AC Cement	2	2-19 liter pails	Two Mix Plants
Combined Aggregate (Uncoated)			
Surface Course	1	1-208 liter drum	One Asphalt Plant
Binder Course	2	1-208 liter drum	Two Asphalt Plants
Base Course	2	1-208 liter drum	Two Asphalt Plants

Table 5. Field Activities During and Post Construction

	SUBG Layer	DGAB Layer	AC Base Layer	AC Binder Layer	AC Surface Layer	AC Cement Material	Combined Aggregate Material
In-Situ Density	94/07/15 94/07/16	94/07/25			94/11/11		
Shelby Tube Sampling	94/07/16						
Shoulder Probe	94/07/16						
Bulk and Moisture Sampling	94/07/16	94/07/25	94/08/10 94/08/11	94/08/11 94/08/12	94/08/12	94/08/16	94/08/16
Rod&Level Elevations *	94/07/14 94/07/15 *elev. #1*	94/08/09 *elev. #2*	94/08/11 *elev. #3*	94/08/12 *elev. #4*	94/08/16 *elev. #5*		
Photos Taken	94/07/13 94/07/16	94/07/26	94/08/10 94/08/11	94/08/11 94/08/12	94/08/12 94/11/09 94/11/11 94/11/22		
Video Recording					94/09/06		
Site Markings					94/09/06		
Profilometer Testing					94/09/06		
FWD Testing	94/07/14 94/07/15	94/07/25 94/08/03			94/11/09		
MDS Survey					94/11/11		
102 mm Coring					94/11/22		

Date format is in yy/mm/dd

* Note: Refer to Figure 3 for elevation number locations.

Table 6. Guidelines vs Actual Initial Monitoring Measurement Dates

Measurement Type	Monitoring Period After Construction	Monitoring Date as per the Guidelines - Construction Finished August 12, 1994	Actual Monitoring Date
Deflection	1-3 Months	Sep.12 - Nov.12, 1994	November 9, 1994
Profile	< 2 Months	Before Oct.12, 1994	September 6, 1994
Distress Survey	< 6 Months	Before Feb.12, 1995	November 11, 1994
Friction	3-12 Months	November 12, 1994 - August 12, 1995	

Table 7. Field and Laboratory Material Testing

Test Type	SHRP Test Desig.	SHRP Prot-ocol	Tests per Layer	Material Source /Test Location	Comments
SUBGRADE					
Sieve Analysis	SS01	P51	3	B1-B3	
Hydrometer to 0.01 mm	SS02	P42	3	B1-B3	
Atterberg Limits	SS03	P43	3	B1-B3	
Classification and Type	SS04	P52	12	A1-A9, B1-B3	Visual only
Moisture/Density Relations	SS05	P55	3	B1-B3	
Resilient Modulus	SS07	P46	3	A1, A4, A7	
Unit Weight	SS08	P56	9	A1-A9	
Natural Moisture Content	SS09	P49	3	B1-B3	
Unconfined Comp Strength	SS10	P54	3	A2, A5, A8	
Permeability	SS11	P57	1	A3	
In-Place Density		LTPP	12	T1-T9, B1-B3	
Depth to Rigid Layer		LTPP	3	S1, S2, S3	
Expansion Index	SS12	P60	3	B1-B3	
UNBOUND GRANULAR BASE					
Particle Size Analysis	UG01	P41	3	B4-B6	
Sieve Analysis (washed)	UG02	P41	3	B4-B6	
Atterberg Limits	UG04	P43	3	B4-B6	
Moisture/Density Relations	UG05	P44	3	B4-B6	
Resilient Modulus	UG07	P46	3	B4-B6	
Classification	UG08	P47	3	B4-B6	
Permeability	UG09	P48	3	B4-B6	
Natural Moisture Content	UG10	P49	3	B4-B6	
In-Place Density		LTPP	12	T10-T18, B4-B6	
AC SURFACE, BINDER, AND BASE					
Core Exam./Thickness	AC01	P01	24	All Cores	
Bulk Specific Gravity	AC02	P02	24	All Cores	
Maximum Specific Gravity	AC03	P03	8	BV1-BV3, BV5-BV9	Bulk samples of HMAC taken from plant or roadway prior to compaction
AC% (Extraction)	AC04	P04	8	BV1-BV3, BV5-BV9	
Moisture Susceptibility	AC05	P05	8	BV1-BV3, BV5-BV9	
Creep Compliance	AC06	P06	1	C14	
Resilient Modulus	AC07	P07	3	[C1-C3] [C9-C11] [C17-C19]	
Tensile Strength	AC07	P07	12	[C1-C4] [C9-C12] [C17-C20]	
In-Place Density		LTPP	9	T19-T27	

Table 7(Cont.). Field and Laboratory Material Testing

Test Type	SHRP Test Desig.	SHRP Prot-ocol	Tests per Layer	Material Source /Test Location	Comments
ASPHALT CEMENT					
Abson Recovery	AE01	P21	3	BV1-BV3, BV5-BV9	
Penetration (50, 77, 90F)	AE02	P22	3	BV1-BV3, BV5-BV9	
Specific Gravity (60F)	AE03	P23	3	BV1-BV3, BV5-BV9	
Viscosity at 77F	AE04	P24	3	BV1-BV3, BV5-BV9	
Viscosity at 140F, 275F	AE05	P25	3	BV1-BV3, BV5-BV9	
EXTRACTED AGGREGATE					
Specific Gravity:					
Coarse Aggregate	AG01	P11	3	BV1-BV3, BV5-BV9	
Fine Aggregate	AG02	P12	3	BV1-BV3, BV5-BV9	
Type and Classification:					
Coarse Aggregate	AG03	P13	3	BV1-BV3, BV5-BV9	
Fine Aggregate	AG03	P13	3	BV1-BV3, BV5-BV9	
Gradation of Aggregate	AG04	P14	3	BV1-BV3, BV5-BV9	
Particle Shape NAA Test:					
Fine Aggregate Shape	AG05	P14A	3	BV1-BV3, BV5-BV9	
Coarse Aggregate Shape	AG06	P14B	3	BV1-BV3, BV5-BV9	
ASPHALT CEMENT (from tanker)					
Penetration (50, 77, 90F)	AE02	P22	3	BC01, BC02	Bulk samples taken from two plants
Specific Gravity (60F)	AE03	P23	3	BC01, BC02	
Viscosity at 77F	AE04	P24	3	BC01, BC02	
Viscosity at 140F, 275F	AE05	P25	3	BC01, BC02	

Table 8. Construction Geometrics and Dates

Section ID and Structure	Subgrade Completed yy/mm/dd	DGAB Completed yy/mm/dd	AC BASE Completed yy/mm/dd	AC Binder Completed yy/mm/dd	AC Top Completed yy/mm/dd
360801 25 mm AC TOP 0 mm AC BINDER 76 mm AC BASE 203 mm DGAB	94/07/15	94/08/02	94/08/10	-	94/08/12
360802 25 mm AC TOP 38 mm AC BINDER 114 mm AC BASE 305 mm DGAB	94/07/15	94/08/02	94/08/11	94/08/11	94/08/12
360859 25 mm AC TOP 38 mm AC BINDER 102 mm AC BASE 305 mm DGAB	94/07/15	94/08/02	94/08/11	94/08/12	94/08/12

Table 9. Nuclear Gage In Situ Densities and Moisture Contents During and Post Construction

Section	360801			360802			360859		
Layer	**Subg**	**DG-AB**	**AC TOP**	**Subg**	**DG-AB**	**AC TOP**	**Subg**	**DG-AB**	**AC TOP**
Date 94/mm/dd	07/15 07/16	07/25	11/11	07/15 07/16	07/25	11/11	07/15 07/16	07/25	11/11
Depth from Surface to top of layer	305 mm	102 mm	0 mm	483 mm	178 mm	0 mm	470 mm	165 mm	0 mm
Density* kg/m^3									
Rod Depth	305 mm	152 mm	BS	305 mm	152 mm	BS	305 mm	152 mm	BS
0-50								2214	
0-45							1993		
1+00	2057	2177	2292	1876	2193	2235	1985	2179	2302
2+50	2143	2185	2251	2001	2204	2231	1938	2214	2276
3+85								2180	
3+90							1940		
4+00	2098	2228	2254	1929	2231	2239			2193
5+35		2177			2212				
5+40	2132			1863					
Moisture*									
	BS	BS		BS	BS		BS	BS	
0-50								2.7	
0-45							7.2		
1+00	5 6	2.1		9 4	2 6		9.0	2.7	
2+50	5.1	2.2		8 9	2.4		9.5	2.7	
3+85								2.3	
3+90							5 3		
4+00	5.4	2 6		8 1	2.7				
5+35		2.4			2.2				
5+40	0.5			7.1					

* Note: Density is either Direct Transmission (rod depth given in mm) or Back Scatter BS. Moisture is always Back Scatter BS.

Table 10. Asphalt Concrete Mixing Temperatures

Section ID	360801		360802			360859		
Layer	**Base**	**Top**	**Base**	**Binder**	**Top**	**Base**	**Binder**	**Top**
Temp ^{o}C	127 129 138 135 138 135	143 141	143 135 138 135 132 135 146 143 149 135 143 132	141 138 149 143 138 149	143 141	143 141 146 143 135 132	143 143	146 138
Average	134	142	139	143	142	140	143	142
Minimum	127	141	132	138	141	132	143	138
Maximum	138	143	149	149	143	146	143	146
Std Dev	4 2	1 4	5 5	4 7	1.4	4 9	0.0	4.2
Number	6	2	12	6	2	6	2	2

Note: Air temperature and weather conditions during paving are summarized in Table 12

Table 11 Location of Paving Material from the Two Asphalt Batch Plants

Section ID	Lane	AC Base		AC Binder		AC Top	
360801 111+00-116+00	Right Paving Lane	0+00-5+00	ST	No AC Binder	-	0+00-5+00	ST
	Left Paving Lane	0+00-5+00	ST	No AC Binder	-	0+00-5+00	ST
360802 119+00-124+00	Right Paving Lane	0+00-0+17 0+17-1+30 1+30-2+43 2+43-5+00	ST BR ST BR	0+00-0+78 0+78-2+00 2+00-4+75 4+75-5+00	ST BR ST BR	0+00-5+00	ST
	Left Paving Lane	0+00-5+00	ST	0+00-0+50 0+50-2+50 2+50-3+80 3+80-4+75 4+75-5+00	BR ST BR ST BR	0+00-5+00	ST
360859 132+50-137+50	Right Paving Lane	0+00-5+00	BR	0+00-5+00	ST	0+00-5+00	ST
	Left Paving Lane	0+00-5+00	ST	0+00-5+00	ST	0+00-5+00	ST

ST - Genesee LeRoy Stone Corp Stafford Asphalt Batch Plant
BR - Iroquois Rock Products Brockport Asphalt Batch Plant
Right Paving Lane 1 52 m outside shoulder + 3 15 m of the right GPS lane
Left Paving Lane 0 51 m of the right GPS lane + 3 66 m left passing lane

Table 12. Paving Dates, Times, Locations, Directions, and Weather Conditions

Date	Time	Section ID	Paving Lane**	AC Layer	Station*	Weather
Aug. 10, 94	0800-1015	360859	Left	Base	500-0	Sunny
	1215-1345	360802	Left	Base	500-0	16°C
	1430-1540	360801	Left	Base	500-0	Sunny
	1625-1740	360801	Right	Base	0-500	24°C
Aug. 11, 94	0740-0905	360802	Right	Base	0-500	Cloudy
	1105-1310	360859	Right	Base	0-500	16°C
	1430-1445	360859	Left	Binder	500-0	Cloudy,
	1550-1635	360802	Left	Binder	500-0	Overcast
	1720-1745	360802	Right	Binder	0-500	24°C
Aug. 12, 94	0630-0735	360859	Right	Binder	0-500	Sunny
	1110-1120	360859	Left	Top	500-0	17°C
	1140-1150	360802	Left	Top	500-0	
	1155-1205	360801	Left	Top	500-0	
	1240-1255	360801	Right	Top	0-500	Sunny
	1300-1325	360802	Right	Top	0-500	24°C
	1345-1400	360859	Right	Top	0-500	

* Note: Station 500-0 indicates that paving started at station 500 and ended at station 0, while station 0-500 indicates that paving started at station 0 and ended at station 500

** Note: Right Paving Lane: 1.52 m outside shoulder + 3.15 m of the right GPS lane
Left Paving Lane: 0.51 m of the right GPS lane + 3.66 m left passing lane

Table 13. Core Thicknesses from the Field Material Sampling and Testing Forms

		Before Section		After Section		Design Specs H ± 7 mm		
Section ID	**Offset m**	**Core #**	**Thickness H mm**	**Core #**	**Thickness H mm**	**Thickness H mm**	**Lower Limit**	**Upper Limit**
360801	1.98	CA01	122*	CA05	160**	102	95	109
	1.52	CA02	127*	CA06	175**			
	1.07	CA03	135*	CA07	168**			
	0.61	CA04	147*	CA08	173**			
360802	1.98	CA09	183	CA13	168*	178	171	185
	1.52	CA10	183	CA14	178			
	1.07	CA11	175	CA15	188*			
	0.61	CA12	175	CA16	208*			
360859	1.98	CA17	193*	CA21	193*	165	158	172
	1.52	CA18	193*	CA22	198*			
	1.07	CA19	203*	CA23	203*			
	0 61	CA20	203*	CA24	208*			

* Note: Outside specification thickness limits.

** Note: The thickness of these cores in sample area 2 are not representative of section 360801. Transition started from station 5+00 and AC binder was used here.

Table 14. Layer Thicknesses from Rod and Level Elevations

	360801				360802					360859				
SP H		203	76	25		305	114	38	25		305	102	38	25
LOC	Station	DGAB	BASE	SURF	Station	DGAB	BASE	BIND	SURF	Station	DGAB	BASE	BIND	SURF
EOP	11100	210	91	40	11900	277	125	76	6	13250	268	107	49	30
OWP		219	85	37		311	98	76	12		302	98	40	34
MID		219	88	37		338	91	76	9		317	85	40	37
IWP		219	79	37		323	98	73	9		302	91	43	30
CL		210	76	37		314	107	61	12		305	94	40	27
EOP	11150	210	91	30	11950	280	122	79	6	13300	351	101	46	21
OWP		229	88	34		305	104	79	6		357	85	43	27
MID		213	82	40		287	155	43	9		335	98	43	27
IWP		201	82	40		271	125	64	12		335	94	43	27
CL		241	73	37		283	107	58	15		326	107	37	24
EOP	11200	216	101	24	12000	293	128	49	12	13350	305	101	52	18
OWP		226	98	34		293	110	46	15		311	94	46	27
MID		216	88	37		314	101	52	9		302	94	46	27
IWP		216	91	34		308	104	49	12		305	91	40	30
CL		216	91	30		299	113	40	18		311	98	30	24
EOP	11250	223	116	30	12050	305	131	58	6	13400	338	98	46	30
OWP		244	88	34		323	107	52	12		329	88	46	30
MID		220	85	37		323	104	52	15		314	101	40	27
IWP		204	82	40		329	113	49	15		308	94	37	27
CL		186	88	40		341	116	40	12		317	94	34	24
EOP	11300	198	113	34	12100	268	122	49	27	13450	341	98	46	30
OWP		229	88	34		299	107	46	27		344	82	46	30
MID		232	85	37		299	94	49	24		317	94	40	30
IWP		213	82	40		299	94	46	24		293	101	43	27
CL		210	94	37		274	110	43	27		305	98	37	24
EOP	11350	198	119	30	12150	296	146	55	15	13500	357	107	49	30
OWP		223	91	30		326	128	55	18		335	107	43	30
MID		219	91	34		302	122	58	18		317	110	40	30
IWP		216	82	40		290	122	52	21		299	110	37	30
CL		207	88	40		320	116	49	24		305	101	37	24
EOP	11400	207	119	27	12200	265	180	46	27	13550	338	110	49	34
OWP		238	107	30		296	155	46	30		354	91	46	30
MID		226	98	34		305	131	43	30		302	101	46	30
IWP		219	88	30		317	131	37	30		308	98	40	30
CL		219	85	27		338	125	27	27		299	94	40	27
EOP	11450	201	110	21	12250	219	152	55	24	13600	320	116	37	27
OWP		241	94	27		299	122	55	21		317	101	37	27
MID		229	94	30		314	107	52	24		290	107	37	30
IWP		229	88	34		311	104	52	24		277	98	37	27
CL		198	85	30		302	107	49	24		274	104	34	27
EOP	11500	192	113	18	12300	311	131	61	12	13650	320	122	37	34
OWP		229	98	18		326	107	61	18		338	107	34	30
MID		219	91	24		332	107	61	18		338	104	30	34
IWP		226	79	27		320	110	58	15		320	101	30	30
CL		204	82	30		323	110	52	15		311	107	30	24
EOP	11550	256	94	18	12350	299	134	55	12	13700	323	131	18	30
OWP		256	79	24		329	107	55	12		323	110	27	30
MID		229	82	27		305	107	55	12		323	98	24	34
IWP		216	73	34		311	104	52	15		293	91	21	30
CL		213	73	30		308	98	46	21		287	98	24	30
EOP	11600	293	110	37	12400	290	134	55	15	13750	314	107	12	37
OWP		265	107	43		314	113	55	18		351	79	18	30
MID		250	107	43		311	113	58	18		335	82	15	34
IWP		247	98	43		299	101	64	12		308	101	18	34
CL		241	107	37		314	101	49	18		293	107	27	27
AVG		222*	92*	33*		304	116	54*	17*		316*	100	37	29
MIN		186	73	18		219	91	27	6		268	79	12	18
MAX		293	119	43		341	180	79	30		357	131	52	37
DEV		19	12	6		21	17	11	7		21	9	9	3

* Note: Outside specification thickness (SP H) limits of total design thickness +/- 7 mm.

Table 15. IRI Values from the Profilometer Survey

	Profilometer	
Section ID	Date Surveyed yy/mm/dd	Average IRI of 5 Runs m/km
360801	94/09/06	1.003
360802	94/09/06	1.068
360859	94/09/06	0.932

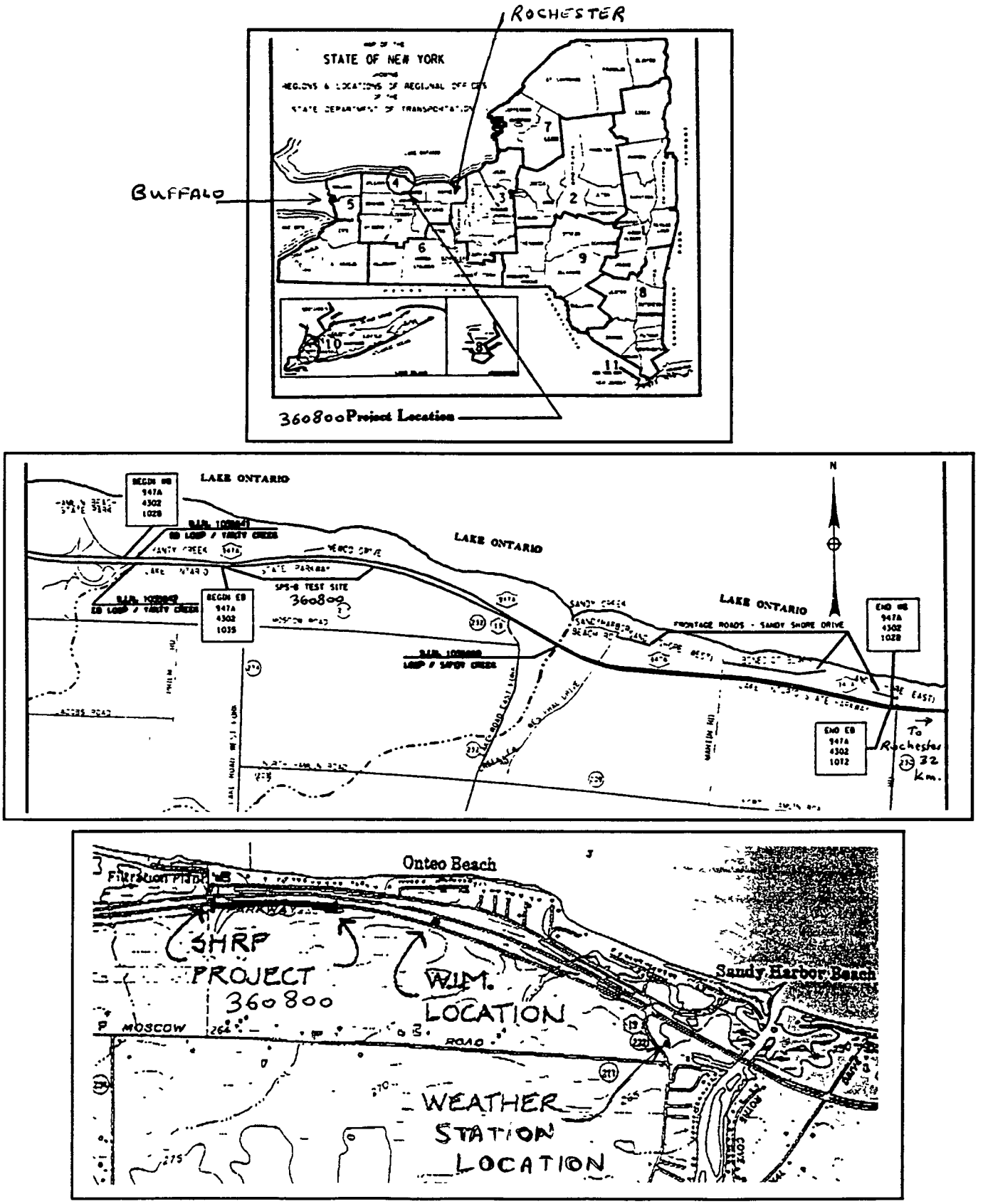


Figure 1 Site Location Maps - SPS Project 360800

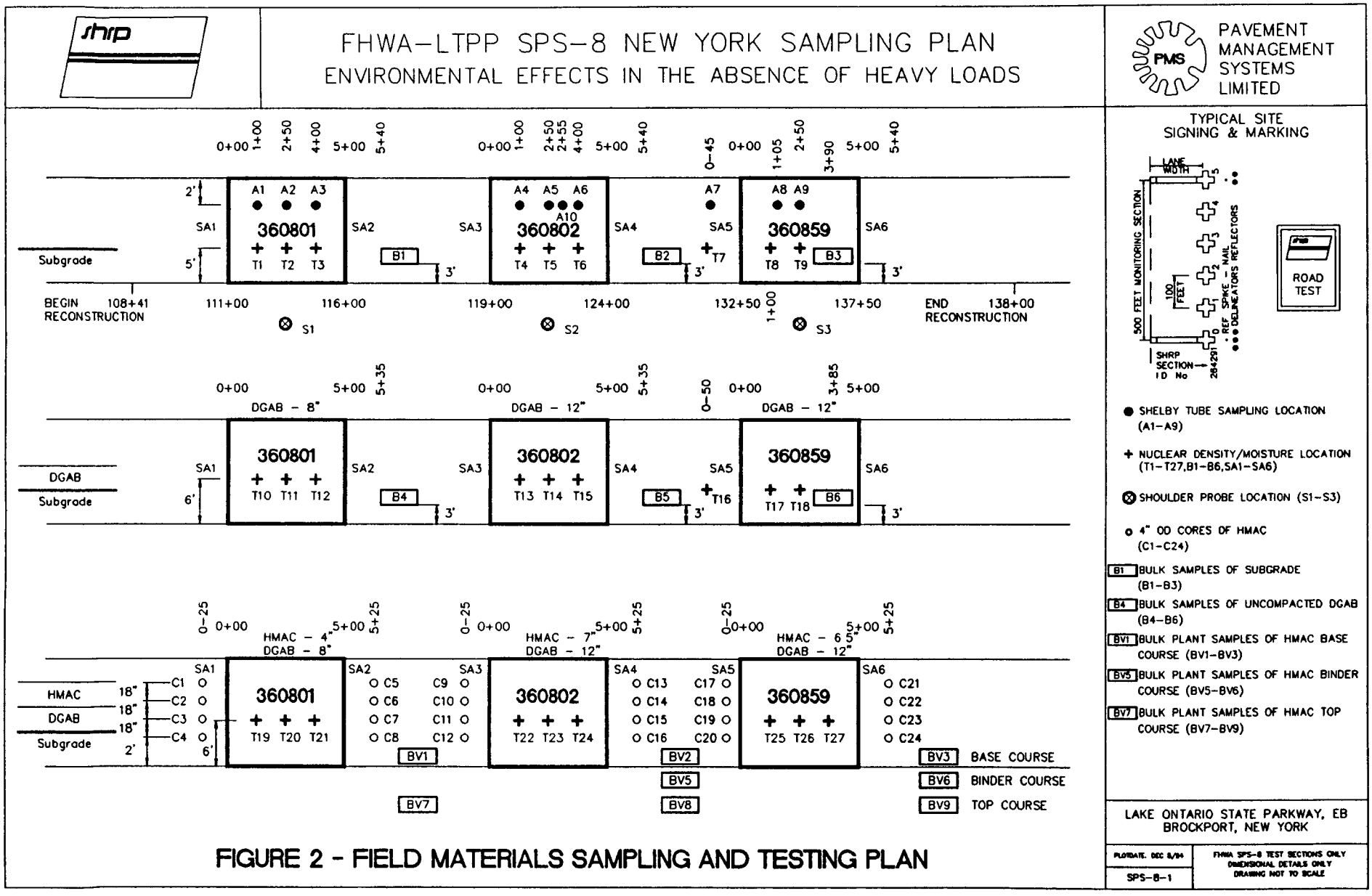
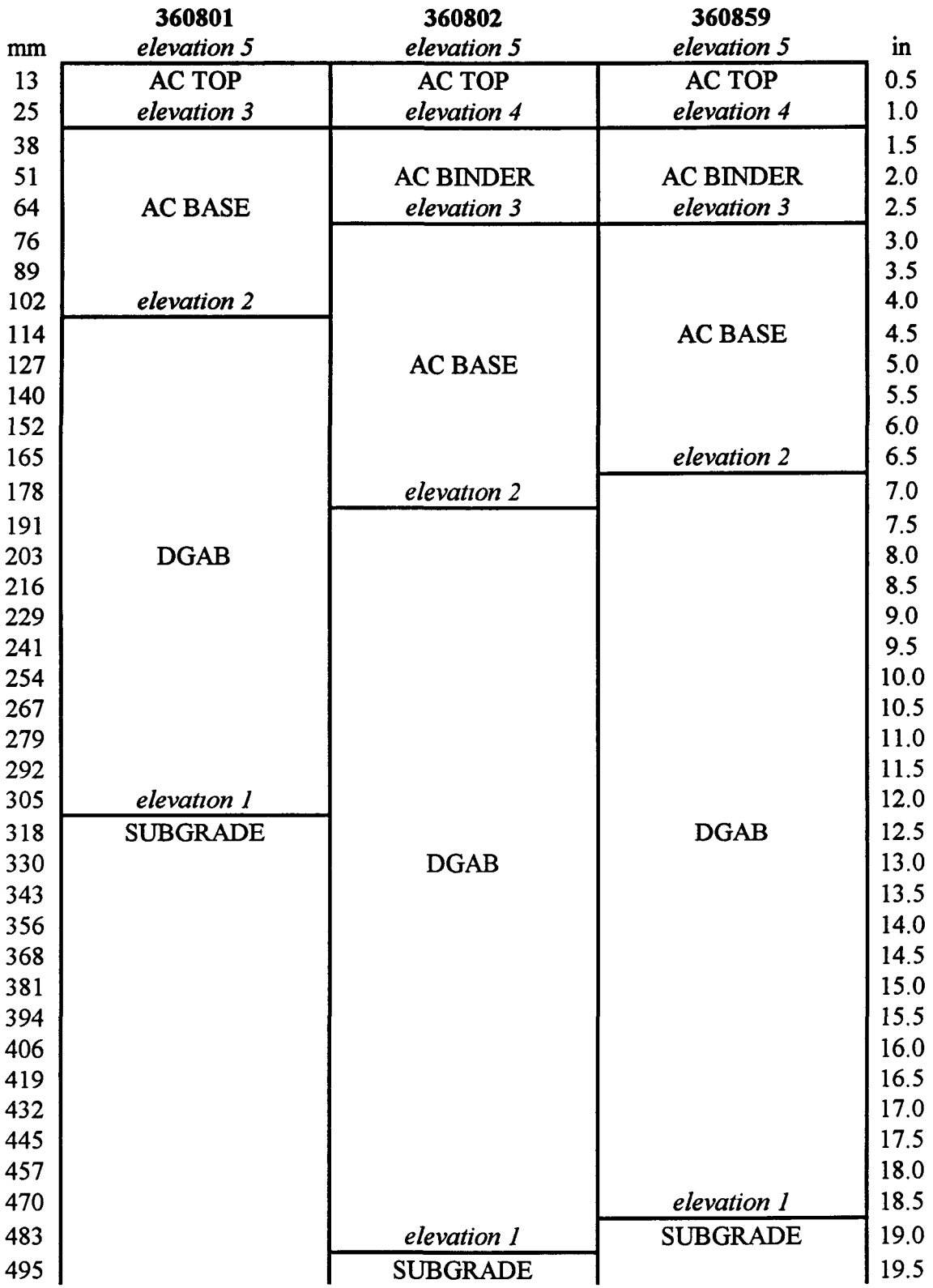


FIGURE 2 - FIELD MATERIALS SAMPLING AND TESTING PLAN



Note: Refer to Table 5 for the dates of the five stages of elevation measurements.

Figure 3. Pavement Structures and the Five Stages of Rod and Level Elevations

AC Base

	360801		360802		360859	
1540	1430	1345	1215	1015	0800	Paving Time
CL non GPS passing lane	ST		ST		ST	<=Aug 10 Paving Date
JT GPS lane						
Aug 10=> Paving Date	ST BV1 (2+50)	Aug 11=> Paving Date	ST-BR* BV2 (2+50)		BR BV3 (1+00)	(Locations of Bulk Samples BV1-BV3)
1625	1740	0740	0905	1105	1310	Paving Time

AC Binder

		1635	1550	1445	1430	Paving Time
CL non GPS passing lane	NO		ST-BR**		ST	<=Aug 11 Paving Date
JT GPS lane	BINDER					
		Aug 11=> Paving Date	ST-BR*** BV5 (2+50)	Aug 12=>	ST BV6 (3+50)	(Locations of Bulk Samples BV5-BV6)
		1720	1745	0630	0735	Paving Time

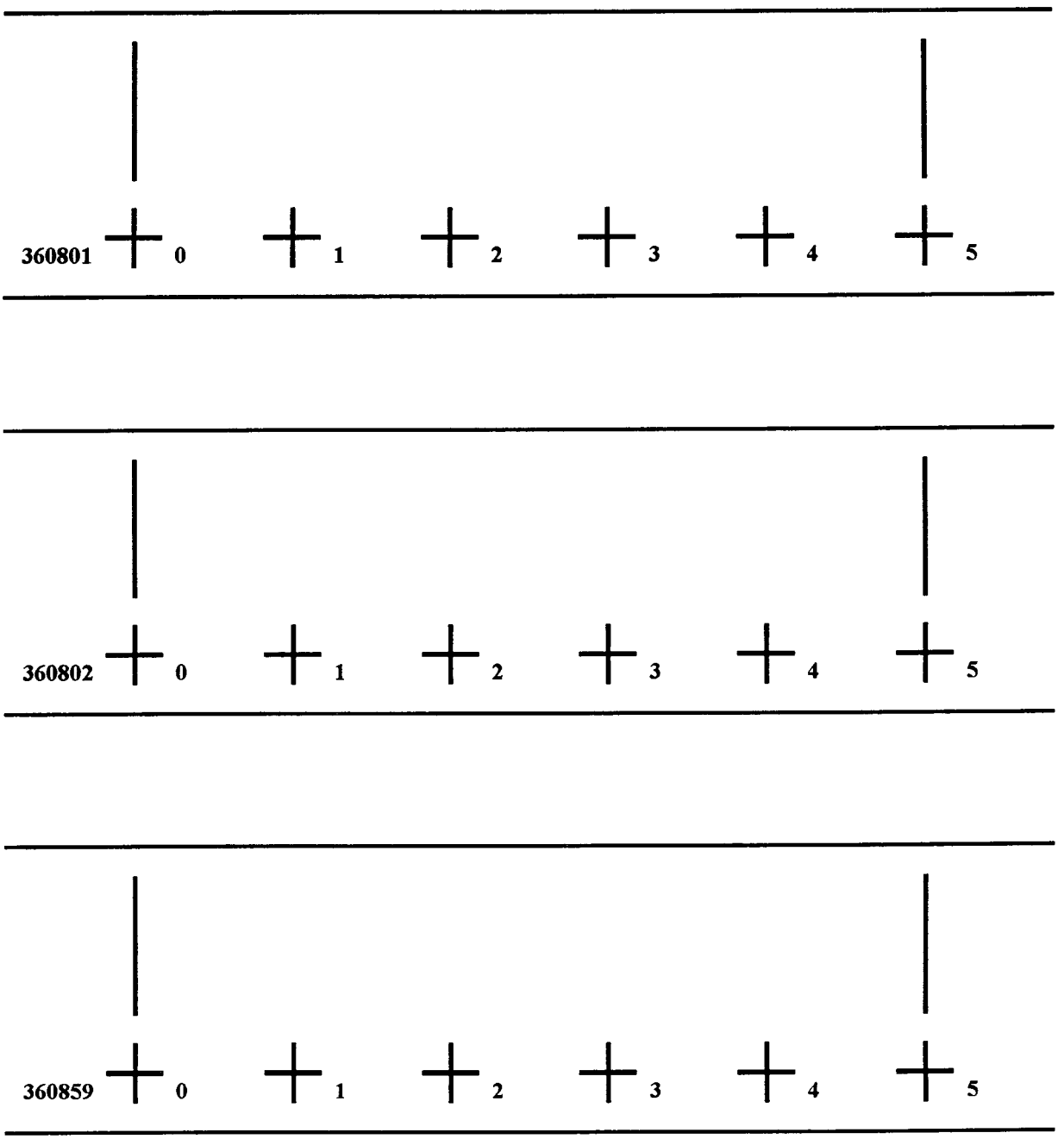
AC Top

1205	1155	1150	1140	1120	1110	Paving Time
CL non GPS passing lane	ST		ST		ST	<=Aug 12 Paving Date
JT GPS lane						
Aug 12=> Paving Date	ST BV7 (2+50)		ST BV8 (2+50)		ST BV9 (1+00)	(Locations of Bulk Samples BV7-BV9)
1240	1255	1300	1325	1345	1400	Paving Time
0+00	5+00	0+00	5+00	0+00	5+00	Experim. Stations
111+00	116+00	119+00	124+00	132+50	137+50	Constr Stations

Not to scale

* Note: Paving 0+00-0+17(ST), 0+17-1+30(BR), 1+30-2+43(ST), 2+43-5+00(BR)
** Note: Paving 0+00-0+50(BR), 0+50-2+50(ST), 2+50-3+80(BR), 3+80-4+75(ST), 4+75-5+00(BR)
*** Note. Paving 0+00-0+78(ST), 0+78-2+00(BR), 2+00-4+75(ST), 4+75-5+00(BR)
ST - Genesee LeRoy Stone Corp Stafford Asphalt Batch Plant
BR - Iroquois Rock Products Brockport Asphalt Batch Plant
BV1-BV9 - AC Bulk Samples Collected From Paver at Station (2+50)
CL - Center Line
JT - Longitudinal Paving Joint

Figure 4. Paving Dates, Times, Material Source, and Bulk Sample Locations



Not to scale

Figure 5 Site Marking Plan

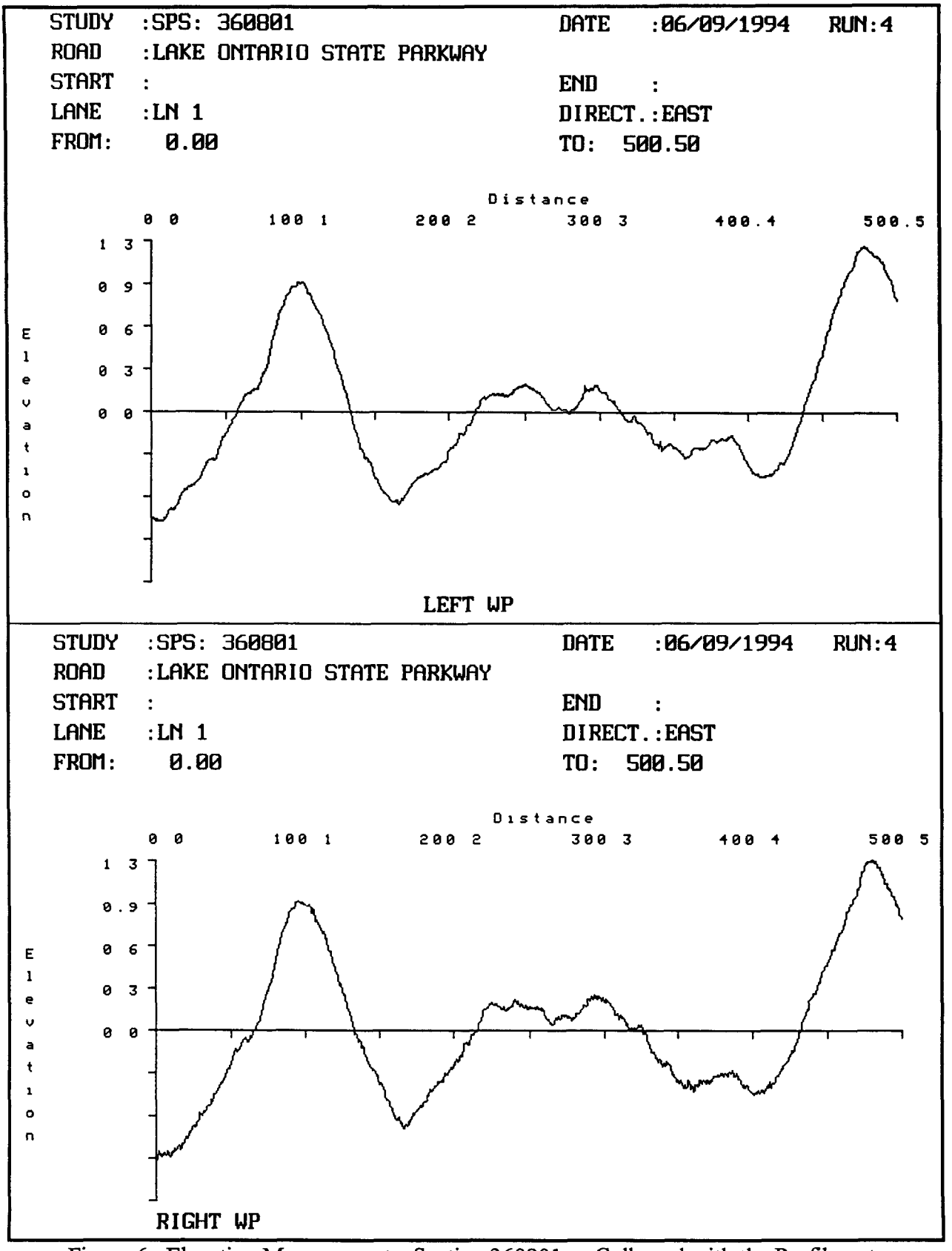


Figure 6. Elevation Measurements, Section 360801 as Collected with the Profilometer

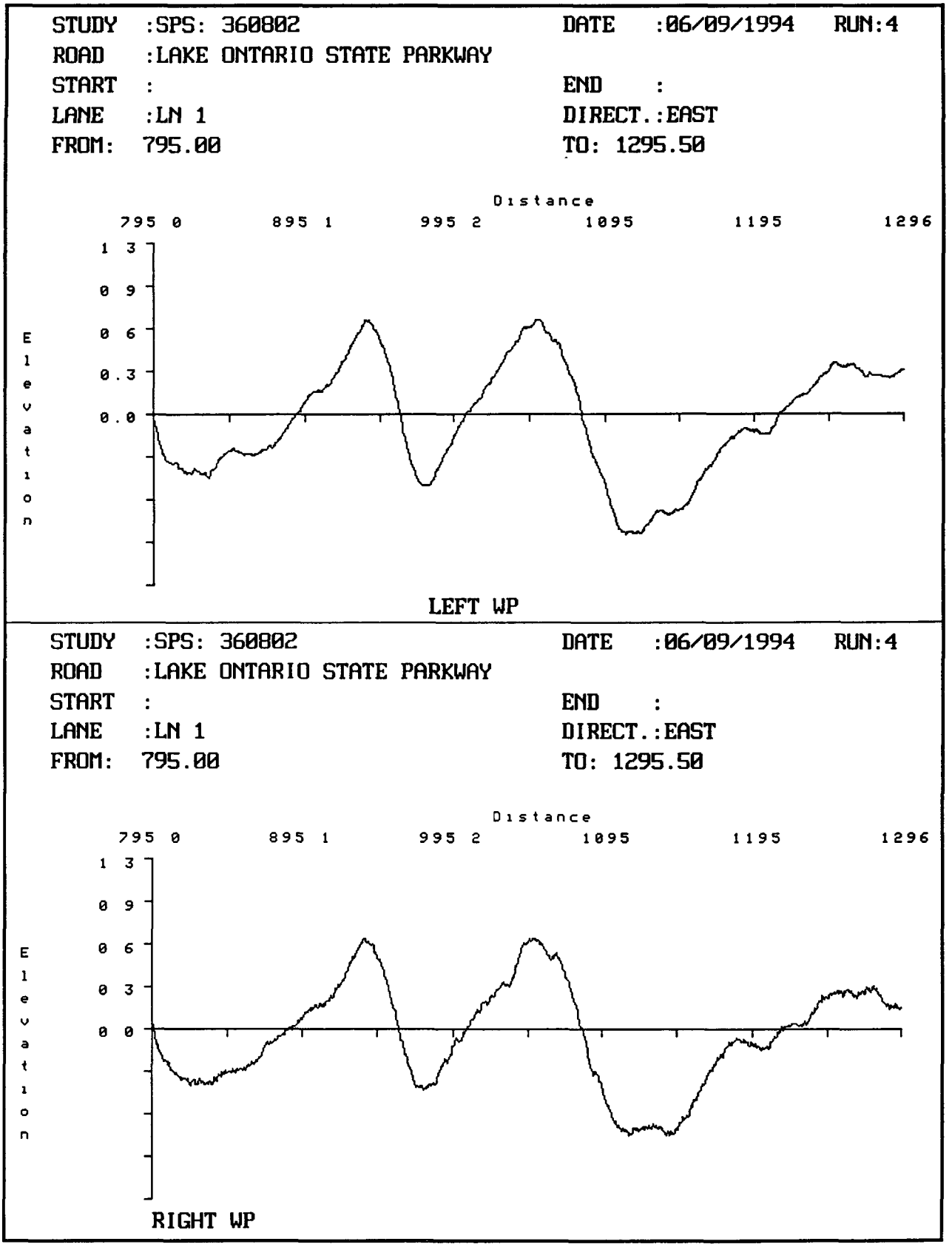


Figure 7 Elevation Measurements, Section 360802 as Collected with the Profilometer

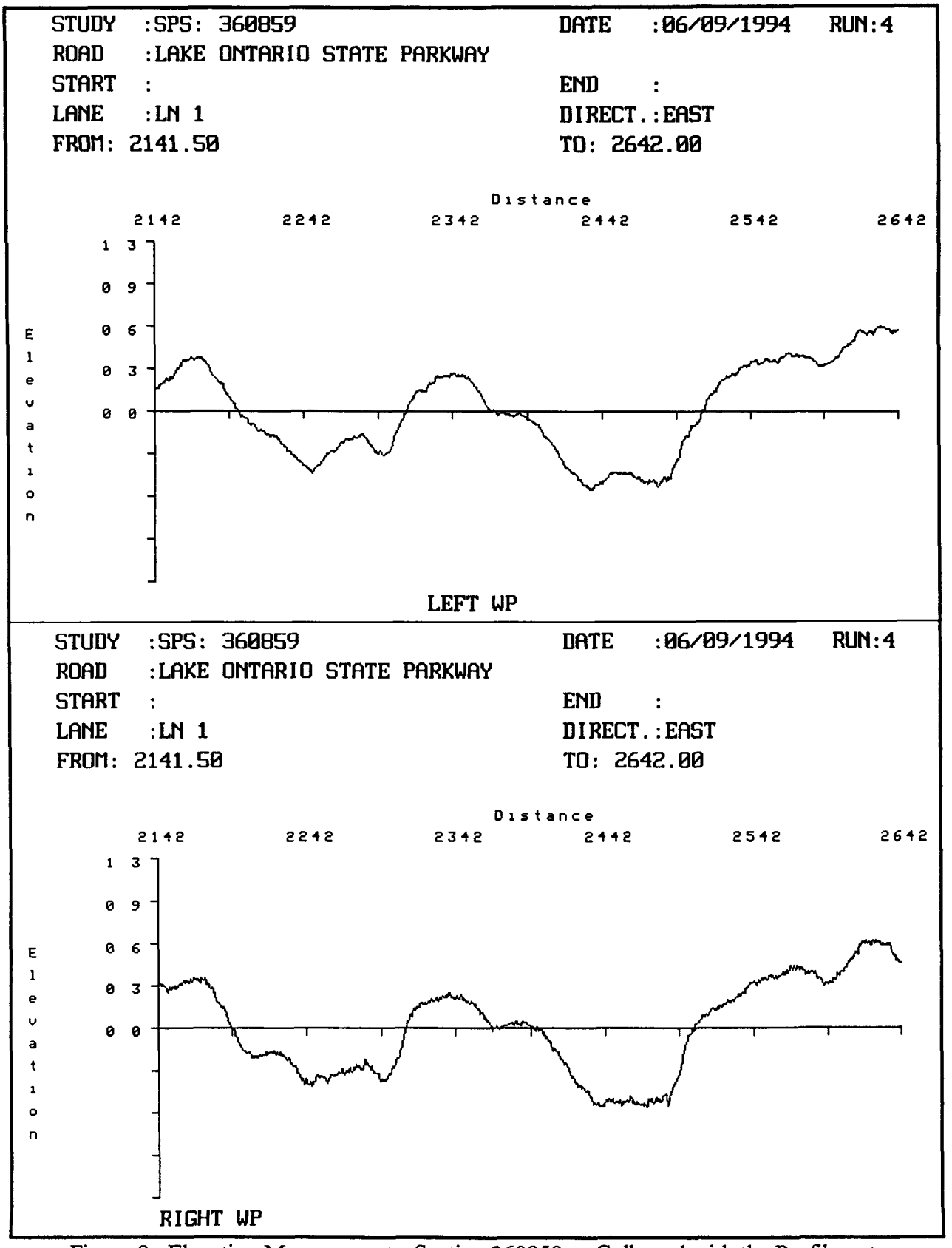


Figure 8. Elevation Measurements, Section 360859 as Collected with the Profilometer

APPENDIX A

Correspondence and Job Mix Formulas

PAVEMENT MANAGEMENT SYSTEMS

MEMORANDUM

TO:	Wes Yang, NY DOT	**DATE:**	November 06, 1992
FROM:	Bill Phang	**PROJECT:**	50450810
SUBJECT:	NYS DOT SPS-8, Materials Sampling and Testing Plan	**FILE:**	13.12.8
		COPIES TO:	See Below

The materials sampling and testing plans developed by the North Atlantic Regional office in accordance with the Material Sampling and Testing Requirements for SPS-8, Operational Memorandum No. SHRP-LTPP-OM-030, August 1992, is forwarded enclosed and includes the following:

1. a revised SPS-8 layout with the monitoring test sections located with respect to construction stationing
2. Table 1 - NYS DOT SPS-8 Field and Laboratory Materials Testing Plan
3. Table 2 - Scope of Field Testing
4. Table 3 - Scope of Material Sampling
5. Sketch plan showing the locations of sampling and field testing during construction as identified in Table 1

The sampling and testing procedures and protocols are to be carried out by the agency in accordance with the SHRP-LTPP Interim Guide for Laboratory Materials Handling and Testing, SHRP-LTPP-OG-004 with the exception of the Creep Compliance, Resilient Modulus, and Tensile Strength tests which are to be carried out by an FHWA designated laboratory.

The equipment for nuclear density/moisture testing and asphalt concrete density must be in-calibration, and the calibration records made available to the regional office.

Distribution to:
I.J. Pecnik
M. Symons
S. Tayabji
S. DiCenzo

415 LAWRENCE BELL DRIVE
UNIT #3
AMHERST, N.Y. 14221
TEL. (716) 632-0804
FAX (716) 632-4808

PAVEMENT
MANAGEMENT
SYSTEMS

August 26, 1993
50450910-13.12.8

Mr. Carl Jarvis
New York State Department of Transportation
1220 Washington Avenue
State Campus, Building 7A
Albany, New York 12232

RE: NYS DOT SPS-8 Materials and Testing Plan

Dear Carl,

Enclosed please find 1] an updated version of the SPS-8 Field Materials Sampling and Testing Plan together with 2] a NARO version of the Special Provisions to the Contract covering the requirement for the contractor to take samples and carry out the field testing, which you had sent to me for comments.

You will note there is now a provision to take samples of asphalt mixes, asphalt cement, and combined aggregates for both binder and surface courses, for the Materials Reference Library in Austin, Texas. This is a recent added requirement.

There is no new information of the weather station. However the equipment which is to be supplied by FHWA is currently under test by FHWA at the Turner Fairbanks Research Center in Virginia.

I trust this response to your request for comment is not too tardy. Thanks for your cooperation in developing this project.

Yours Sincerely,
PAVEMENT MANAGEMENT SYSTEMS LIMITED

Bill Phang

W.A. Phang, D. Eng.
Program Manager, FHWA-LTPP

BP/tf
c.c. I.J. Pecnik
W. Yang
B. Abukhater

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PAVEMENT
MANAGEMENT
SYSTEMS

February 9, 1994
50450910-13.12.8

Ms. Sally Olsen
New York State Department of Transportation
1530 Jefferson Road
Rochester, New York 14623-3161

RE: NY DOT SPS-8 Project, lake Ontario State Parkway

Dear Sally,

The FHWA-LTPP North Atlantic Regional Office acknowledges receipt of a copy of the D254995 Plans and Proposal for reconstruction of a segment of the Lake Ontario State Parkway, sent February 02, 1994 by Mr. C.E. Moynihan, Regional Design Engineer.

A review of Book 1 page 188 and page 215 revealed an outdated location for the Materials Reference Library. FHWA recently contracted with Nichols Consulting Engineers, (NCE) 1885 South Arlington Avenue, Suite 111, Reno, Nevada 89509, telephone (702) 329-4955, fax (702) 329-5098, to manage and operate the Materials Reference Library which has been moved to 1625 Crane Way, Sparks, Nevada 89431.

NCE has a negotiated agreement with a common carrier, and will bear the cost of shipment of containers and samples. At the appropriate time please call Mr. Andrew Brigg at (702) 358-7574 or fax (702) 329-5098 to make arrangements for shipping samples (listed on page 215). As well, FHWA is in the process of contracting with a laboratory (currently unnamed) to carry out specialized tests on the materials. These tests are the Resilient Modulus Tests (Protocols P46 and P07), and the Creep Compliance Test (P06). In addition the FHWA Contractor Laboratory will carry out some other relevant tests such as Moisture-Density Relations (P44 and P55) and natural moisture content tests (P49) on subgrade and base materials, and bulk and maximum S.G. tests (P02 and P03) on asphalt concrete mixes. The re-assignment of laboratory tests to an FHWA Contractor Laboratory should not invalidate the purpose of Clause 04634.9401 on page 348 of the proposal, but it would affect the scope of the work.

415 LAWRENCE BELL DRIVE
UNIT #3
AMHERST, N Y 14221
TEL (716) 632-0804
FAX (716) 632-4808

A complete list of 300 pound bulk samples, Shelby tube samples, moisture content samples, and 4" cores which are to be packaged and shipped to the FHWA Contractor Laboratory is currently in preparation by NARO. Upon completion, this listing together with other documents will be forwarded and a meeting arranged for clarification and to answer questions.

Yours Sincerely,
PAVEMENT MANAGEMENT SYSTEMS LIMITED

William A. Phang.

W.A. Phang, D. Eng.
Program Manager, FHWA-LTPP

WAP/tf

c.c. I.J. Pecnik
D. Morian
W. Yang
B. Abukhater

PAVEMENT
MANAGEMENT
SYSTEMS

February 15, 1994
50450910-13.12.8

Ms. Sally Olsen
New York State Department of Transportation
1530 Jefferson Road
Rochester, New York 14623-3161

RE: NYS DOT SPS-8 Lake Ontario State Parkway

Dear Sally,

Following up on my acknowledgment of receipt of Proposal D254995 and plans for the SPS-8 project, forwarded enclosed are the following laboratory testing sample tracking tables:-

For Testing by FHWA Contractor Laboratory

- Asphalt Concrete Pavement - Cores
- Unbound Granular Base
- Subgrade

Samples for Materials Reference Library (MRL)

For Testing by NYS DOT Contractor laboratory

- Asphalt Concrete Pavement - Cores
- Hot Mix Surface Course - Bulk Samples
- Hot Mix Binder Course - Bulk Samples
- Hot Mix Base Course - Bulk Samples
- Unbound Granular Base
- Subgrade

These tracking tables are intended firstly to guide the field sampling crew in packaging and shipping samples to the two laboratories and to the materials reference library. Secondly to guide the laboratories in handling and sequencing of the tests.

Please keep me informed as to the status of the contract as this office proposes to have a project construction inspector present during your pre-construction project meeting and during the construction of the test sections.

Yours Sincerely,
PAVEMENT MANAGEMENT SYSTEMS LIMITED

William A. Phang.

William A. Phang, D. Eng.
Program Manager, FHWA-LTPP

c.c. I.J. Pecnik
D. Morian
B. Abukhater
W. Yang

415 LAWRENCE BELL DRIVE
UNIT #3
AMHERST, N Y 14221
TEL (716) 632-0804
FAX (716) 632-4808

PAVEMENT
MANAGEMENT
SYSTEMS

June 20, 1994
50450910-13.12.8

Mr. Eric Wilson
Professional Service Industries
605 Young Street
Tonawanda, New York 14150

Dear Mr. Wilson:

Further to our telephone conversation, please find enclosed the following information on the New York SPS-8 project:

- Field Materials Sampling and Testing Plan (10/93) — 1 page
- Laboratory Testing Sample Tracking Tables — 10 pages
- Lab Data Sheet L03, Preliminary Laboratory Test Assignment — 1 page
- Laboratory Testing Protocols, with data sheets
  (P01, P02, P03, P04, P05, P06, P07, P11, P12
  P14, P21, P22, P23, P24, P25, P41, P42, P43,
  P44, P46, P47, P48, P49, P51, P51A, P52, P54
  P55, P56, P57, P60)

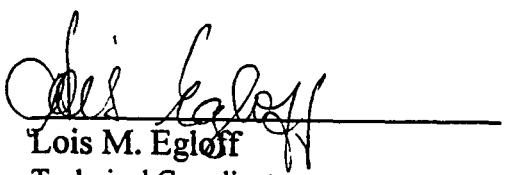
The sampling and testing plan is designed to provide the layout of the project, as well as the locations and number of samples to be obtained. The tracking tables are intended to 1) guide the field sampling crew in packaging and shipping samples to the two laboratories and to the Materials Reference Library (MRL); 2) guide the laboratories in handling and sequence of tests.

Please note that all samples shipped to the two laboratories are to be prepaid. Shipping arrangements for samples destined for the Materials Reference Library are to be coordinated with Mr. Andrew Brigg, (702)358-7574.

415 LAWRENCE BELL DRIVE
UNIT #3
AMHERST, N Y 14221
TEL (716) 632-0804
FAX (716) 632-4808

If you have any questions, or require clarification on the enclosed information, please contact either Dr. William Phang (716) 632-0804, or Mr. Basel Abukhater (519) 622-3005.

Yours Sincerely,



Lois M. Egloff
Technical Coordinator
Pavement Management Systems Limited

LE/tf

C.C. W. Yang, w/o attachment
T. Davison, w/o attachment
I.J. Pecnik, w/o attachment
B. Phang, w/o attachment
D. Morian, w/o attachment
B. Abukhater, w/o attachment

PAVEMENT
MANAGEMENT
SYSTEMS

September 9, 1994
50451010-13.12.8

Ms. Sally Olsen
New York State Department of Transportation
1530 Jefferson Road
Rochester, New York 14623-3161

RE: SPS-8, Lake Ontario State Parkway, Brockport, NY - Signs

Dear Ms. Olsen:

Pavement markings were placed on the Lake Ontario State Parkway, Brockport, NY on September 7, 1994, to define the monitoring lengths of the four test sections which make up the SPS-8 project.

In order that these test sections can be readily located by performance monitoring crews, particularly at night (PASCO photographic distress surveys), signs with the test section's identifying numbers are usually erected at the side of the roadway embankment. As well, a sign with the project number, in this case 360800, is placed 500 ft. ahead of the start of the first test section so that automated equipment in monitoring vehicles traveling at highway speeds are alerted to prepare their equipment.

It is understood that this project sign (360800) is not presently included in the current test section signing activities. It would be appreciated if this additional sign can be placed as indicated above.

Yours Sincerely,

William A. Phang

William A. Phang
Program Manager, FHWA-LTPP
Pavement Management Systems Limited

WAP/tf

C.C. I.J. Pecnik
W. Yang
B. Abukhater

415 LAWRENCE BELL DRIVE
UNIT #3
AMHERST, N Y 14221
TEL (716) 632-0804
FAX (716) 632-4808

PAVEMENT
MANAGEMENT
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September 13, 1994
50451010-13.12.8

Ms. Sally Olsen
New York State Department of Transportation
1530 Jefferson Road
Rochester, New York 14623-3161

RE: SPS-8, LOSP Materials Testing Laboratory I.D. #;s

Dear Ms. Olsen:

It is understood that materials testing for the SPS-8 project on the Lake Ontario State Parkway (LOSP) will be carried out by Professional Service Industries Inc. (PSI).

They propose to carry out subgrade soil tests in their Laboratory at Tonawanda, NY, and at their Pittsburgh, PA Laboratory. Permeability tests on the unbound granular will be done in their Detroit, MI Laboratory. Tests on the asphalt concrete are to be done at their Canton, MA Laboratory.

For purposes of Laboratory Identification in the Long Term Pavement Performance program, these PSI Laboratories are assigned the following I.D. numbers:

Lab. # 3631	PSI, Buffalo 605 Young Street Tonawanda, NY 14150 c/o Eric Wilson	 Tel. (716) 694-8657 Fax (716) 694-8638
Lab. # 4211	PSI, Pittsburgh 850 Poplar Street Pittsburgh, PA 15220 c/o George Miller	 Tel. (412) 922-4010
Lab. #2632	PSI, Detroit 24355 Capital Avenue Detroit, MI 48239 c/o Dennis Bama	 Tel. (313) 255-4200

415 LAWRENCE BELL DRIVE
UNIT #3
AMHERST, N Y 14221
TEL (716) 632-0804
FAX (716) 632-4808

Lab. # 2531 PSI, Canton
905 Turnpike Street
Suite H
Canton, MA 02021 Tel. (617) 821-2355
c/o Tom Bowker

Please inform Professional Service Industries Inc. of these identification numbers, as they should be reported on test result submissions.

Yours Sincerely,

William A. Phang
Program Manager, FHWA-LTPP
Pavement Management Systems Limited

WP/tf

C.C. I.J. Pecnik, RE-NARO
W. Yang, NYSDOT
B. Abukhater, PMSL
L. Egloff, PMSL
B. Worrel, NCRO

PAVEMENT
MANAGEMENT
SYSTEMS

November 25, 1994

Mr. Eric Wilson
Professional Service Industries
605 Young Street
Tonawanda, New York 14150

Dear Eric,

Attached please find two copies of the Field Material Sampling and Testing Reports for all the work done at the SPS-8 site in Rochester, NY, during and after the construction of the three test areas on the east bound of Lake Ontario State Parkway. One copy of these reports should go the FHWA Contractor Laboratory, Law Engineering in Atlanta, GA. The second copy is to be used by the NYS DOT Contractor Laboratory, PSI at their different locations. When you ship any samples to any of the labs you should make sure that a copy of these reports are enclosed, along with a copy of the tracking tables, in the same box with the samples.

The following table summarizes the layer tested, date, and number of sheets of each of the Field Material Sampling and Testing Reports:

Layer	Date Tested	Number of Sheets
Subgrade	July 15-16, 1994	32
DGAB	July 25, 1994	16
AC During Construction	August 10,11,12,16, 1994	18
AC Post Construction	November 11 & 22, 1994	19

If you have any further questions, please do not hesitate to call.

Yours Sincerely,

Basel Abukhater
Project Engineer
Pavement Management Systems Limited

cc I J Pecnik (w/o attachments)
B Phang (w/o attachments)
B. Henderson (w/o attachments)
L. Egloff (with attachments)

Enclosures

415 LAWRENCE BELL DRIVE
UNIT #3
AMHERST, N Y 14221
TEL (716) 632-0804
FAX (716) 632-4808

PAVEMENT
MANAGEMENT
SYSTEMS

ORIGINAL

June 17, 1993
5450821-13.12.8

Dr. Wes Yang
Materials and Pavement Research
New York Department of Transportation
1220 Washington Avenue, State Campus
Building 7A, Room 600
Albany, New York 12232

RE: **Climatic Data Collection Plan for SPS Test Sites**

Dear Wes,

Forwarded enclosed is a "Climatic Data Collection Plan for SPS Test Sites", prepared by PCS/LAW Engineering revised May 1993. The plan describes the site specific climatic data elements which are to be collected, and other desirable data which may be obtained from nearby First Order weather Stations.

Automated Weather Station (AWS) equipment will be supplied by FHWA-LTPP Division for your SPS project. Installation will be carried out by the North Atlantic Region contractor (NARO), who will also be responsible for periodically downloading the data. However the agency will be responsible for establishing the site in accordance with the site selection criteria, preparing the site, constructing foundations for the tower and raingage including the conduits and power supply connections, and enclosing the site with 6' chain link fencing and gate. The equipment is to be maintained by the agency throughout the life of the project.

The FHWA-LTPP Division is presently mounting a pilot project to ascertain that the intended AWS equipment will satisfy the requirements of the program. The AWS equipment for your SPS project will then be acquired and made available to NARO for installation.

It would appear more appropriate to locate the site for the weather station during a site inspection visit than by working off plans in the office, and to have concurrence by NARO at the same time.

Should you have any questions or concerns about these plans, please do not hesitate to contact me.

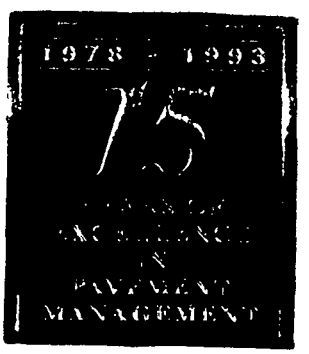
Yours Sincerely,
PAVEMENT MANAGEMENT SYSTEMS LIMITED

Bill Phang

W.A. Phang, D. Eng.
Program Manager, FHWA-LTPP

c.c. I.J. Pecnik w/o encl.
C. Richter w/o encl.
C. Jarvis w/encl.

415 LAWRENCE BELL DRIVE
UNIT #3
AMHERST, N Y 14221
TEL. (716) 632-0804
FAX (716) 632-4808



Date: 10/31/94

REGION 4
DESIGN

Fax Transmittal Sheet

To: IVAN PECNIK / BASEL ABUKHATER
Co.: U.S.D.O.T.
Dept.: PAVEMENT MANAGEMENT SYSTEMS - SHRP
FAX #: (716) 632-4808

From: KEVIN MILLER
Co.: N.Y.S.D.O.T.
Phone #: (716) 272-3366
FAX #: (716) 272-7547

Comments: REVISED WEATHER STATION LOCATION AND AWS FORM. DRAINAGE AND SNOWPLOW DRIFTING WERE IDENTIFIED AS PROBLEMS AT PREVIOUS SITE. PLEASE CALL IF YOU HAVE QUESTIONS OR COMMENT, OTHERWISE WE WILL PROCEED AS CONFIRMED IN PHONE CONV. W/ YOUR OFFICE. THANKS KEVIN

DRAFT

LTPP-SPS AUTOMATIC WEATHER STATION (AWS) INSTALLATION AWS SITE NOMINATION FORM SPS_AWS_2

SHRP REGION N.A. STATE N.Y. STATE CODE 36
SPS EXPERIMENT No. 8 SPS PROJECT CODE 08
ROUTE/HIGHWAY 104SP

PROPOSED AWS SITE LOCATION

1. LOCATION North of inter. of Route 19 & Moscow Rd., Town of Hamlin Monroe Co., NY
2. ELEVATION 260'
3. LATITUDE N 1,221,400 43° 21' 00"
4. LONGITUDE E 682,200 77° 53' 52"
5. DISTANCE 5,400 FT. (from project)

SITE DETAILS

1. Are there any obstructions or large paved areas within 100 ft of the proposed weather station location?
YES / (NO)
If Yes, explain: _____

2. Is proposed site on level terrain? (YES) / NO
If No, explain: _____

3. Is proposed site subjected to standing water (flooding), snow drift etc? YES / (NO)
If Yes, explain: _____

4. Is proposed site on soft ground (swampy area) or full of vegetation that would make access to the AWS difficult? YES / (No)
If Yes, explain: _____

5. Is the proposed site likely to be shaded? YES / (No)
If Yes, explain: _____

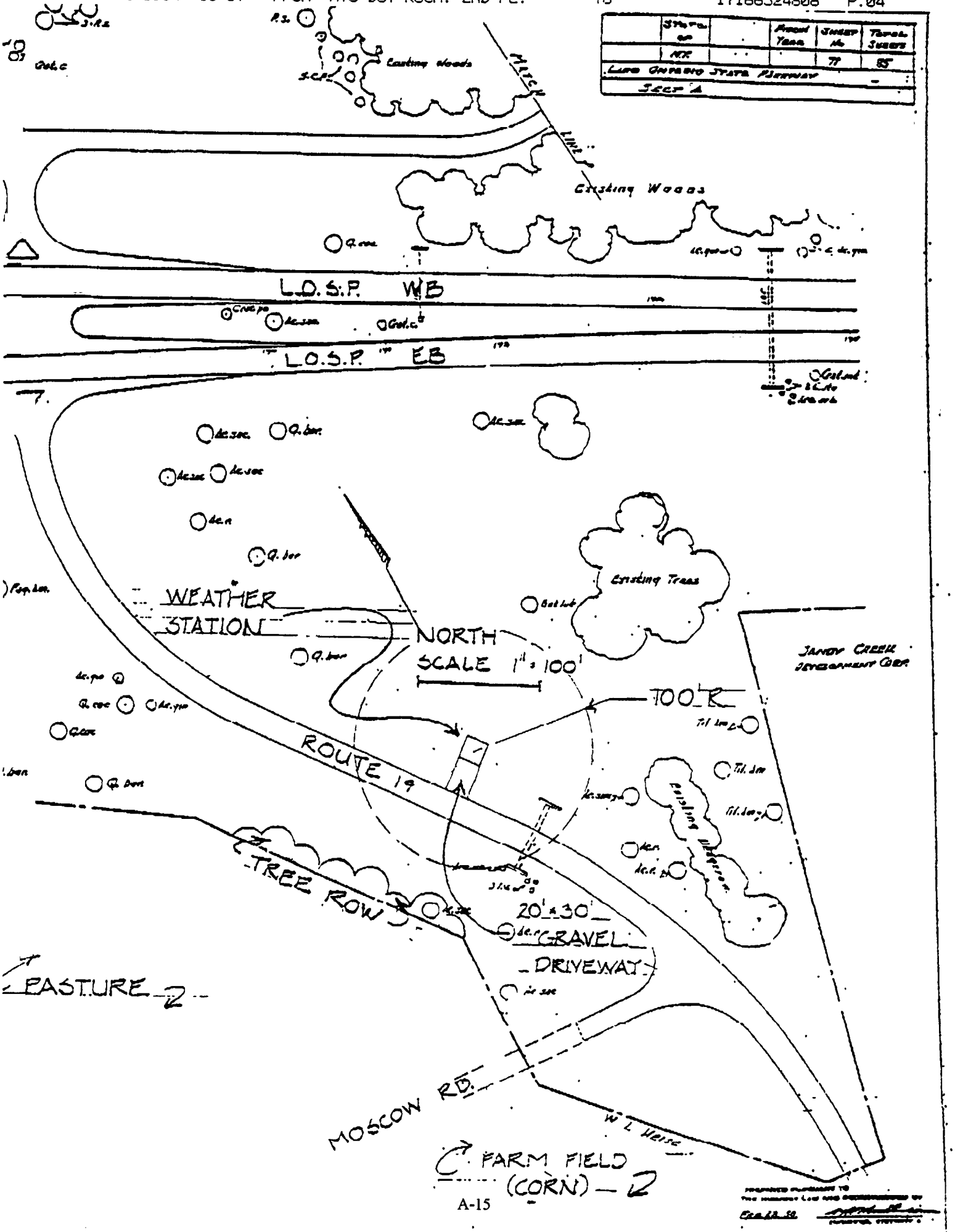
6. Is proposed site secure from theft and/or vandalism? (YES) / No
If No, explain: _____

NOTE: The AWS site within the fence perimeter shall be covered by short grass or where grass does not grow, the natural earth surface. If grass cover is used, then the grass shall be mowed regularly.

RCOC RECOMMENDATION:

It is our opinion that the proposed AWS site is the best possible location for the SPS project.

Submitted by: _____ DATE: _____


Existing Woods
L.O.S.P. WB
L.O.S.P. EB
Existing Trees
WEATHER STATION
NORTH
SCALE 1" = 100'
100'R
ROUTE 19
TREE ROW
20' x 30' GRAVEL DRIVEWAY
PASTURE
MOSCOW RD.
FARM FIELD (CORN)
JANNEY CREEK DEVELOPMENT CORP.

PAVEMENT
MANAGEMENT
SYSTEMS

November 21, 1994
50451027-13.12.8

Mr. Tim Davison
Engineer in Charge
New York State Department of Transportation
Region 4
1530 Jefferson Road
Rochester, New York 14623

RE: Installation of Automated Weather Station (AWS) at the NY SPS-8; Lake Ontario State Parkway

Dear Mr. Davison:

We have recently been informed of the contractor's (Keeler Construction) plan for installing the AWS mounting platforms and compound at the SPS-8 site in the spring of 1995.

It is important for this experiment to obtain the environmental data representing the seasonal changes for the year of construction. In this regard, we would like to see the weather compound and instrumentation installed prior to any frost action on this section. What are the possibilities of encouraging or arranging with the contractor for installation in 1994?

We would appreciate your assistance in approaching the contractor on altering the installation period, to have the site in place before the major brunt of winter occurs.

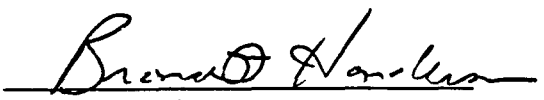
Is there any way we can assist in making this a reality for this year?

415 LAWRENCE BELL DRIVE
UNIT #3
AMHERST, N Y 14221
TEL (716) 632-0804
FAX (716) 632-4808

Please let us know what the possibilities are for advancing the installation of the AWS.

Thank you in advance for your assistance.

Yours Sincerely,



Brandt Henderson
Manager, Field and Data Operations
Pavement Management Systems Limited

BH/tf

C.C. I.J. Pecnik; (NARO-RE)
S. Olsen; (NYSDOT)
T. Cummings; (Keeler)
B. Abukhater; (NARO)

NEW YORK STATE
EPA[redacted]ENT[redacted]TRAI RT/
MATERIALS BUREAU

JOB MIX FORMULA

Type 1 Base (Dense)

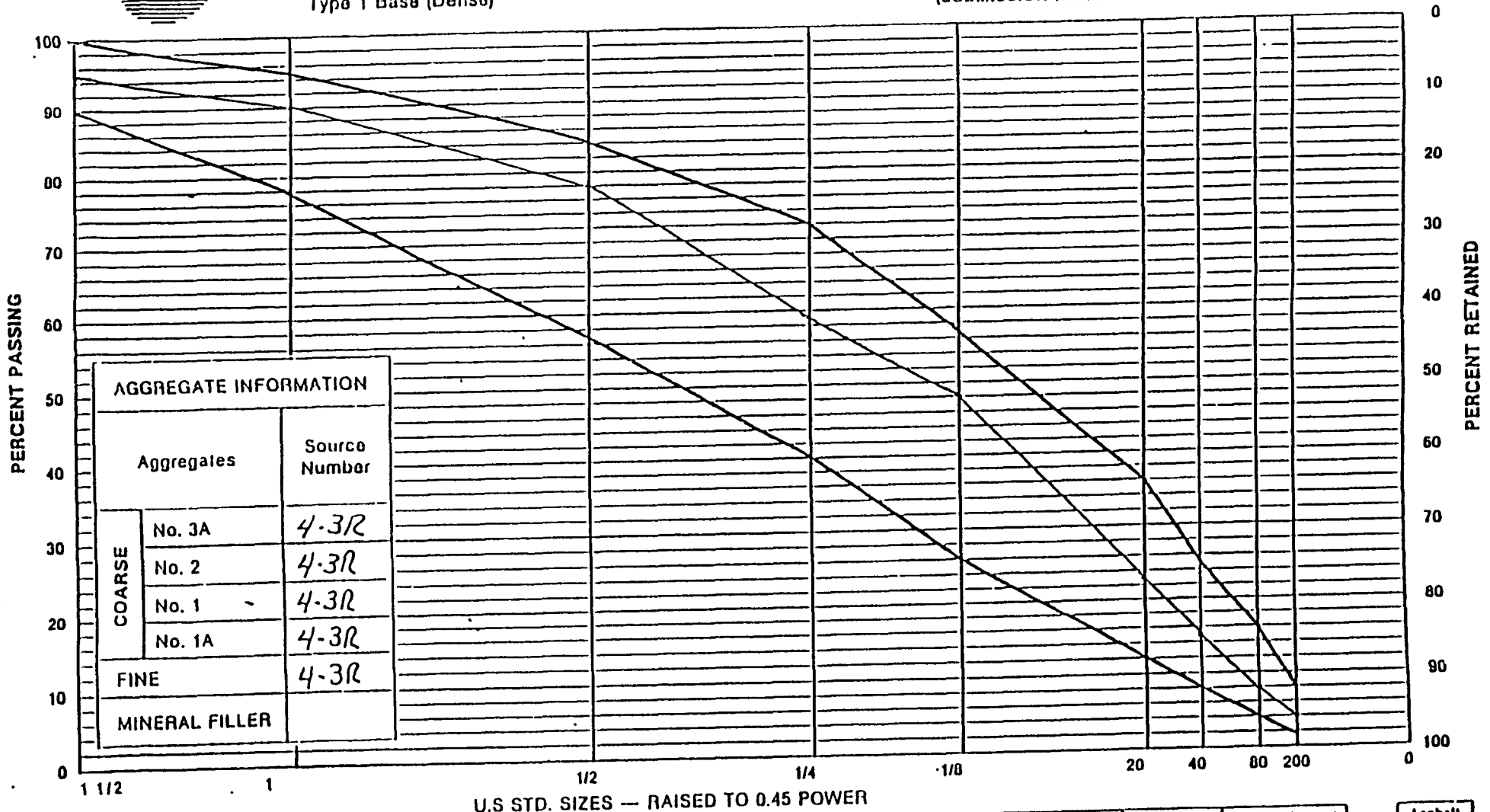
Mix No. [redacted] Rev. [redacted]

Plant [redacted]ENES[redacted]LER [redacted]STONE CORP Reg 4

Plant Location STAFFORD, NY CEDAR RAPIDS P-26

Submitted By Peter Wyborn Date 1/19/90

(SUBMISSION INSTRUCTIONS ON BACK)



AGGREGATE INFORMATION		
Aggregates		Source Number
COARSE	No. 3A	4-3R
	No. 2	4-3R
	No. 1	4-3R
	No. 1A	4-3R
FINE		4-3R
MINERAL FILLER		

Sieve Size		2"	1 1/2"	1"	1/2"	1/4"	1/8"	No. 20	No. 40	No. 80	No. 200	Asphalt Content (Percent)
% Passing	1. General Limits	100	90-100	78 95	57 84	40 72	26 57	12-36	8-25	4-16	2 8	4 0 6.0
	2. JMF Range	100	90-100	85-95	72-84	52-66	43-57	15-29	8-22	4-12	2-6	4.2-5.0
	3. Target Value	100	95	90	78	59	50	22	15	8	4	4.6

Asphalt Grade AC 15

Approved by Regional Director T M Hurley / E. Zoli Date 3/3/93

Remarks:

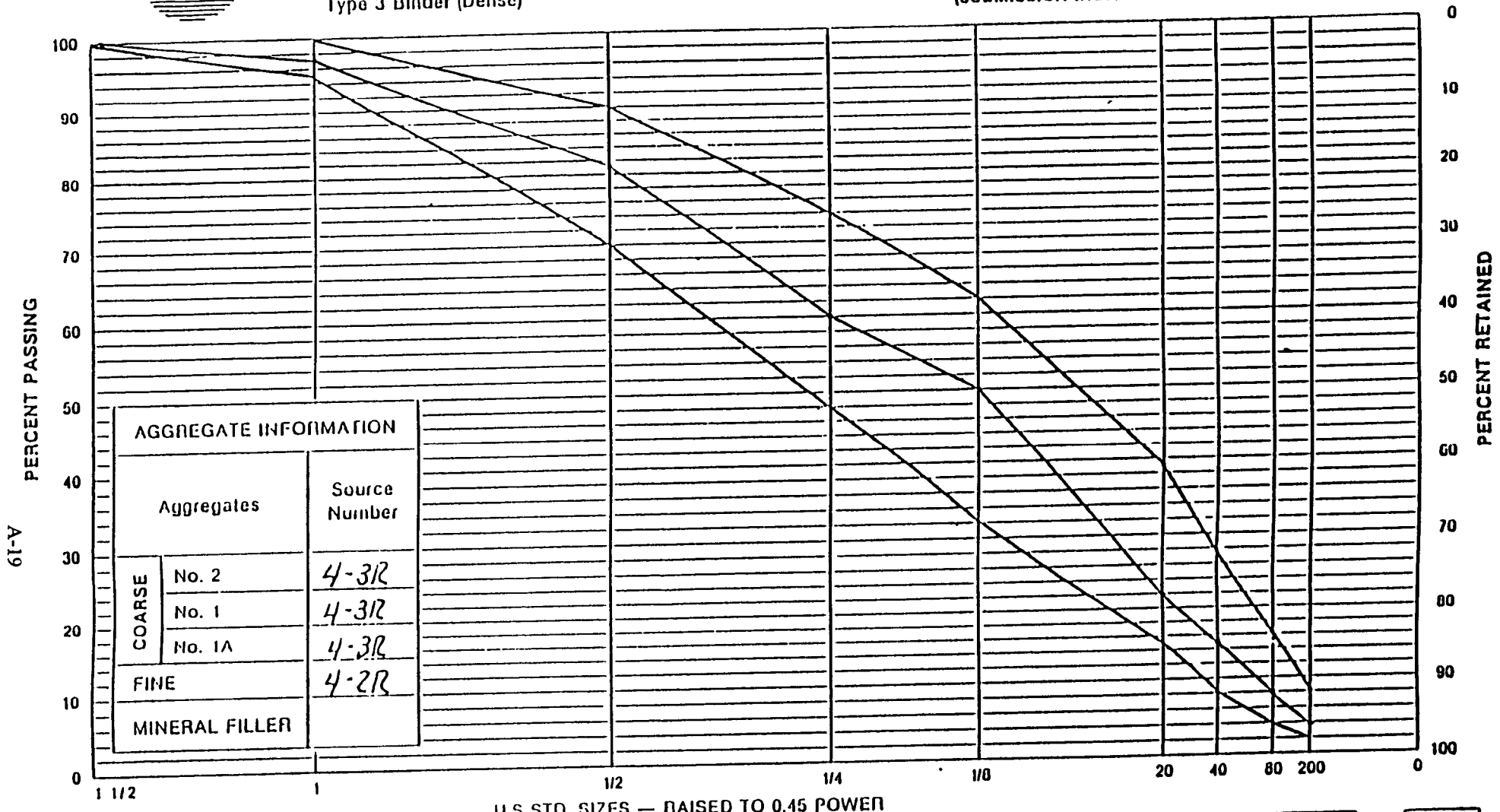
A-18

BR 2900 (2/0 . /

EW (ST)

DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU
JOB MIX FORMULA
Type 3 Binder (Dense)

Plant Genesee Leroy Stone Corp. Region 4
Plant Location Stafford Coarse Rapids Pond P-26
Submitted By Heidi Talbot Date 8/26/92
(SUBMISSION INSTRUCTIONS ON BACK)



A-19

AGGREGATE INFORMATION		
Aggregates		Source Number
COARSE	No. 2	4-3R
	No. 1	4-3R
	No. 1A	4-3R
FINE		4-2R
MINERAL FILLER		

Sieve Size		2"	1 1/2"	1"	1/2"	1/4"	1/0"	No. 20	No. 40	No. 80	No. 200	Asphalt Content (Percent)
% Passing	1. General Limits		100	95 100	70 90	48-74	32 62	15 39	8 27	4-16	2 8	4.5 6.5
	2. JMF Range		100	95 100	75-87	53-67	43-57	15-29	8-22	4-12	2-6	4.8 - 5.6
	3. Target Value		100	97	81	60	50	22	15	8	4	5.2

Asphalt Grade
AC 45

Approved by Regional Director L M Hurley / E. Zoli Date 3/3/93

Remarks:

DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU
JOB MIX FORMULA
MARSHALL MIX DESIGN
Type 7F Top Course (High Friction)

Plant GENESEE LEROY STONE CORP. on N
Plant Location STAFFORD P-26
Submitted By DOUG RUTTERMAN Date 1/29/93
(SUBMISSION INSTRUCTIONS ON BACK)

AGGREGATE SAMPLING FREQUENCY

SAMPLE

PERCENT PASSING

PERCENT RETAINED

A-20

AGGREGATE INFORMATION

	Aggregates	Source Number	Aggregate Blend %
COARSE	No. 1A Stone	4-3RS	45%
COARSE	No.1A Non Carbonate Stone		
FINE	Manufactured	4-3R	55%
FINE	Natural	4-58F1	
MINERAL FILLER			

#1A High Friction Blend	
Manufactured / Natural Sand Blend	35/20

1 1/2 1 1/2 1 1/4 1/8 20 40 80 200

U S STD SIZES — RAISED TO 0.45 POWER

Sieve Size		2"	1 1/2"	1"	1/2"	1/4"	1/8"	No. 20	No. 40	No. 80	No. 200	Asphalt Content (Percent)
% Passing	1. General Limits				100	90-100	45-70	15-40	8-27	4-16	2-6	5.0-8.0
	2. JMF Range				100	90-100	53-65	23-37	13-27	5-13	2-5	
	3 Target Value				100	98	59	30	20	9	3	6.5

Asphalt Grade: AC 15

Recommended for Approval by Regional Director L M Hurley / E. Zoli Date 3/3/93

Approved by Director, Materials Bureau Date

BR 344D (2/89)

NEW JERSEY DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU

JOB MIX FORMULA

Type 1 Base (Dense)

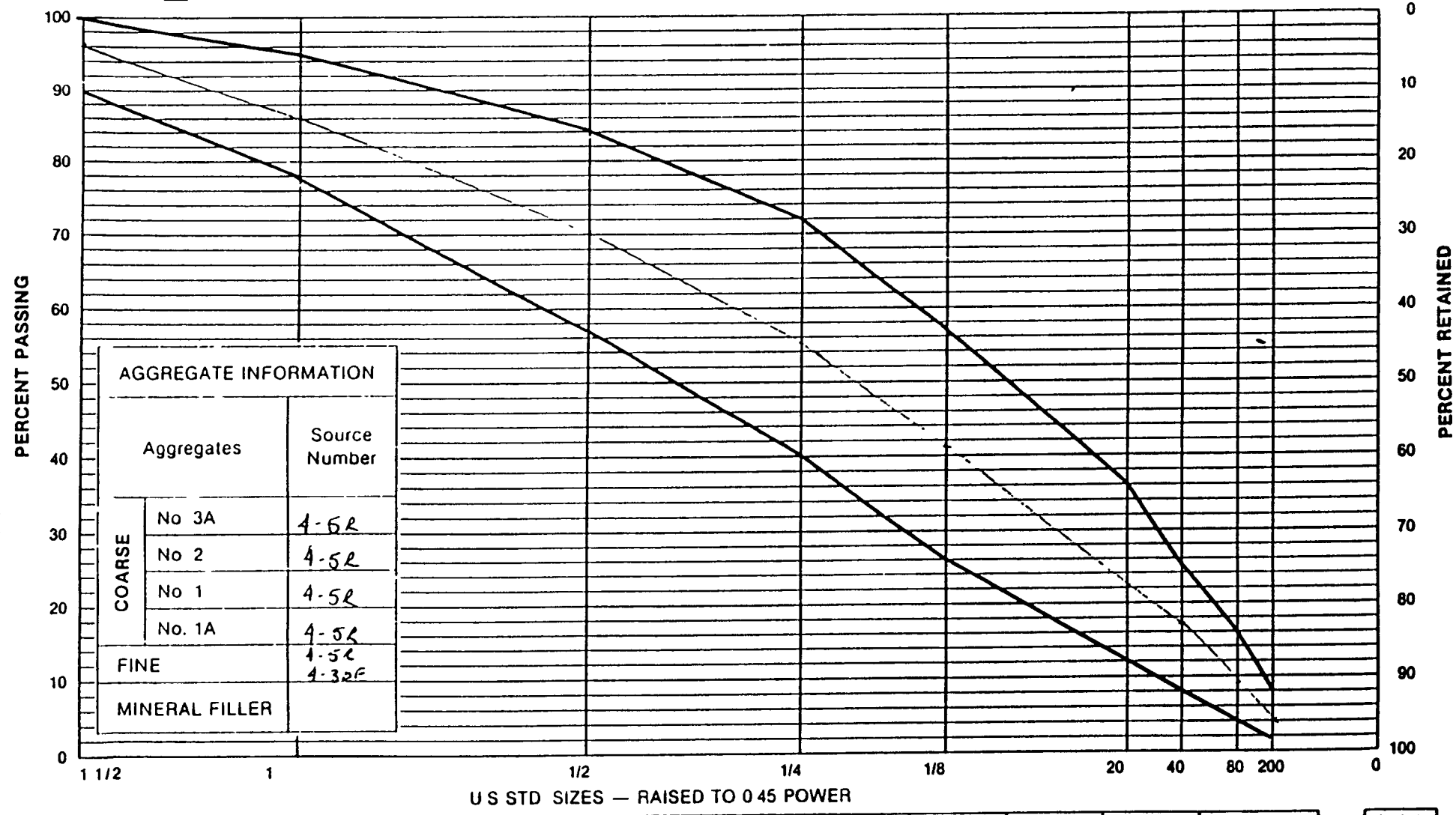
Facility No. 207 Formula No. TL01 11

Plant Illiquois Rock Products Region 4

Plant Location Rockport

Submitted By Gregory D. Rose Date 4-9-92

(SUBMISSION INSTRUCTIONS ON BACK)



A-21

Sieve Size		2"	1 1/2"	1"	1/2"	1/4"	1/8"	No. 20	No. 40	No. 80	No. 200	Asphalt Content (Percent)
% Passing	1. General Limits	100	90-100	78-95	57-84	40-72	26-57	12-36	8-25	4-16	2-8	4.0-6.0
	2 JMF Range	100	90-100	81-91	64-76	48-62	34-48	15-29	10-24	5-13	2-6	4.0-4.8
	3 Target Value	100	96	86	70	55	41	22	17	9	4	4.4

Asphalt Grade
AC 15

Approved by Regional Director L M Gourley / E Zoli Date 4/12/93

Remarks:

.W [redacted] ST
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU

JOB MIX FORMULA

Type 3 Binder (Dense)

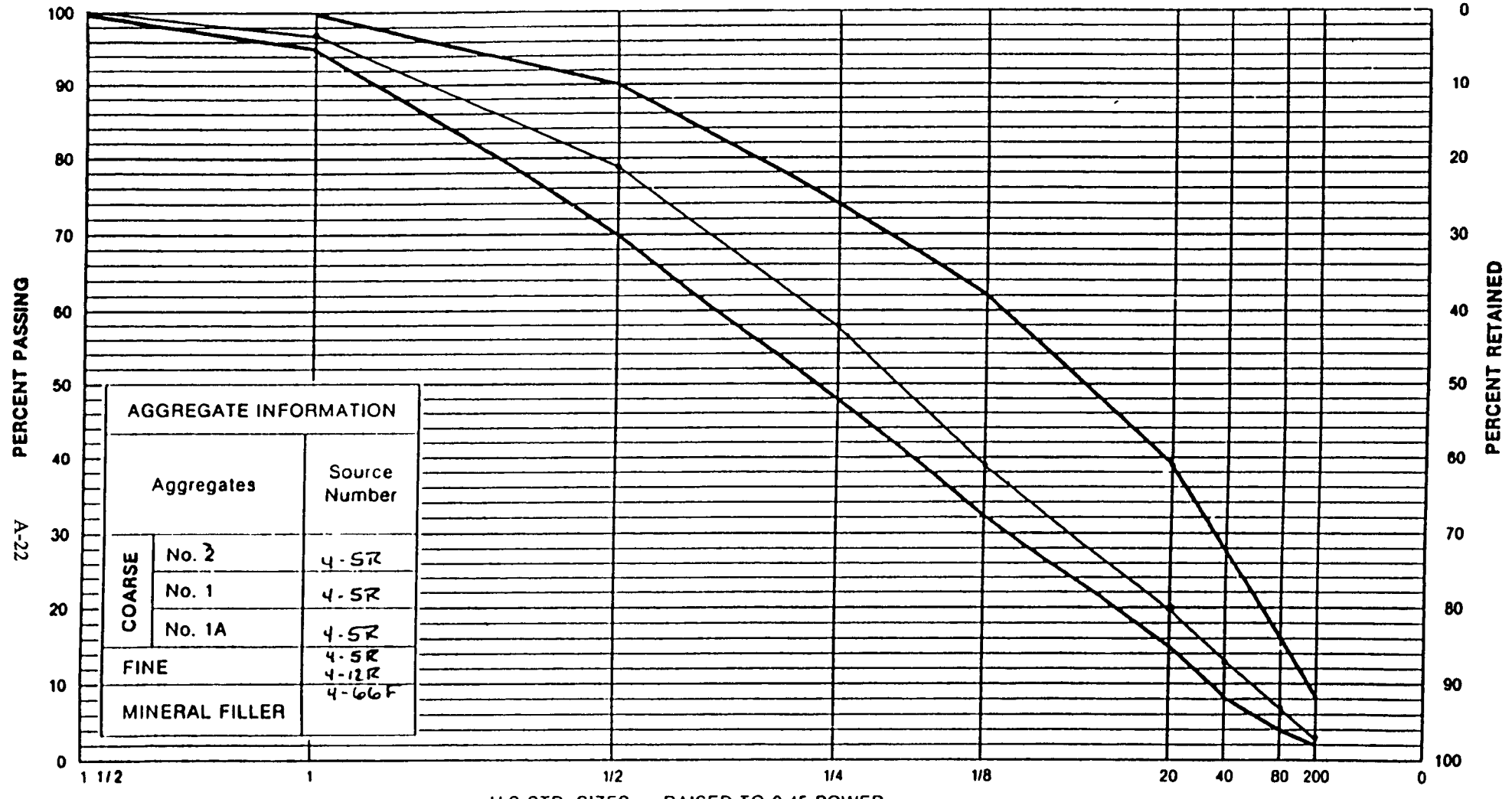
Facil):

Plant IROQUOIS ROCK PRODUCTS Region 4

Plant Location BROCKPORT, NY

Submitted By Gregory J. Rose Date 6-30-94

(SUBMISSION INSTRUCTIONS ON BACK)



AGGREGATE INFORMATION		
Aggregates		Source Number
COARSE	No. 2	4-SR
	No. 1	4-SR
	No. 1A	4-SR
FINE		4-SR 4-12R
MINERAL FILLER		4-66F

Sieve Size		2"	1 1/2"	1"	1/2"	1/4"	1/8"	No. 20	No. 40	No. 80	No. 200	Asphalt Content (Percent)
% Passing	1. General Limits		100	95-100	70-90	48-74	32-62	15-39	8-27	4-16	2-8	4.5-6.5
	2. JMF Range		100	95-100	73-85	51-65	32-46	15-27	8-20	4-11	2-5	4.5-5.3
	3. Target Value		100	97	79	58	39	20	13	7	3	4.9

Asphalt Grade
AC 20

Approved by Regional Director F M Shirley / E Zoll Date 7/1/94

Remarks:

A-22

APPENDIX B

Photographs

Figure B-1. Shale Removed from Shoulder Auger Hole S1 in Section 360801

Figure B-2. Nuclear Density Measurements on the Subgrade Layer of Section 360801

Figure B-3. Paver and Roller on the AC Base Layer at Section 360802 Station 1+50

Figure B-4. Full Depth Coring at Hole C22 in Sampling Area 6 of Section 360859

Figure B-5. Pavement Markings on Section 360802 Showing Starting Stripe

Figure B-6. SHRP Identification Sign at the Beginning of Section 360802 Station 0+00

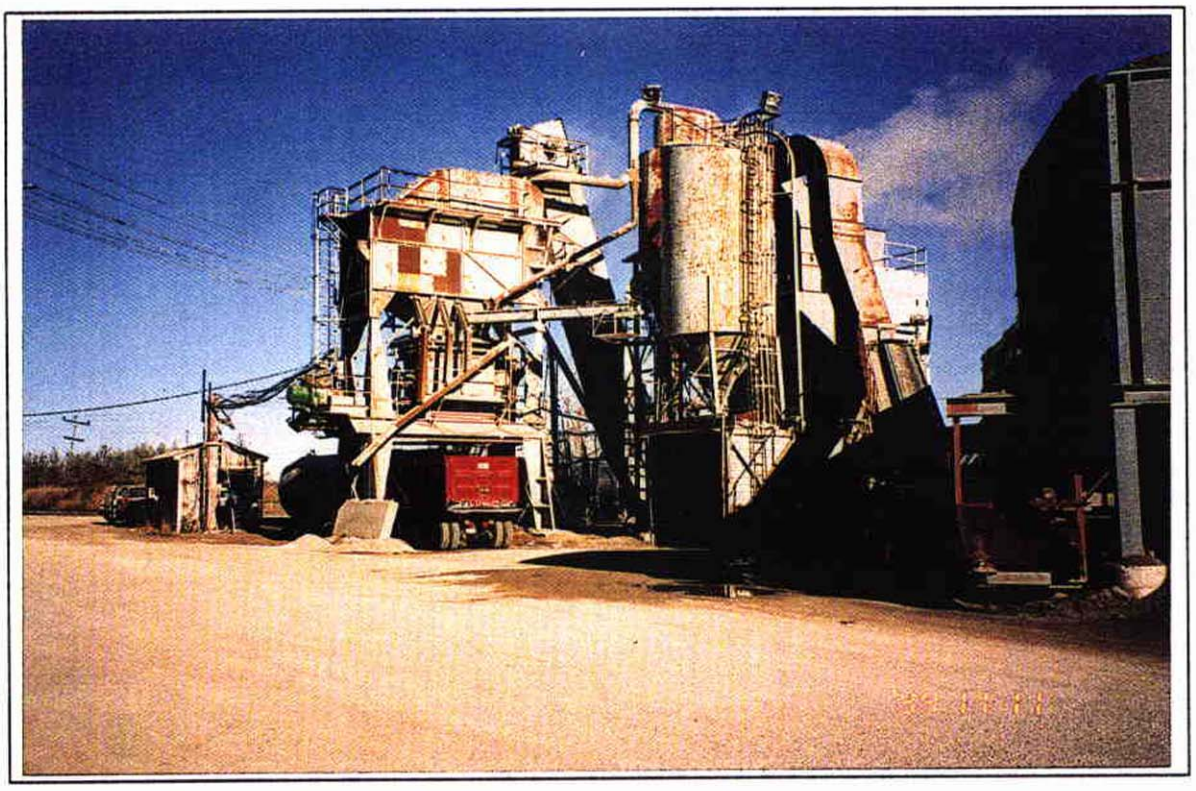


Figure B-7. Iroquois Rock Products Asphalt Batch Plant in Brockport, New York

Figure B-8. Genesee LeRoy Stone Corp. Asphalt Batch Plant in Stafford, New York